

JVC

BR-S822U

Editor Recorder

SA-R22U

Time code Reader/Generator

SA-T22U

Time Base Corrector

Service Training Seminar

Prepared by

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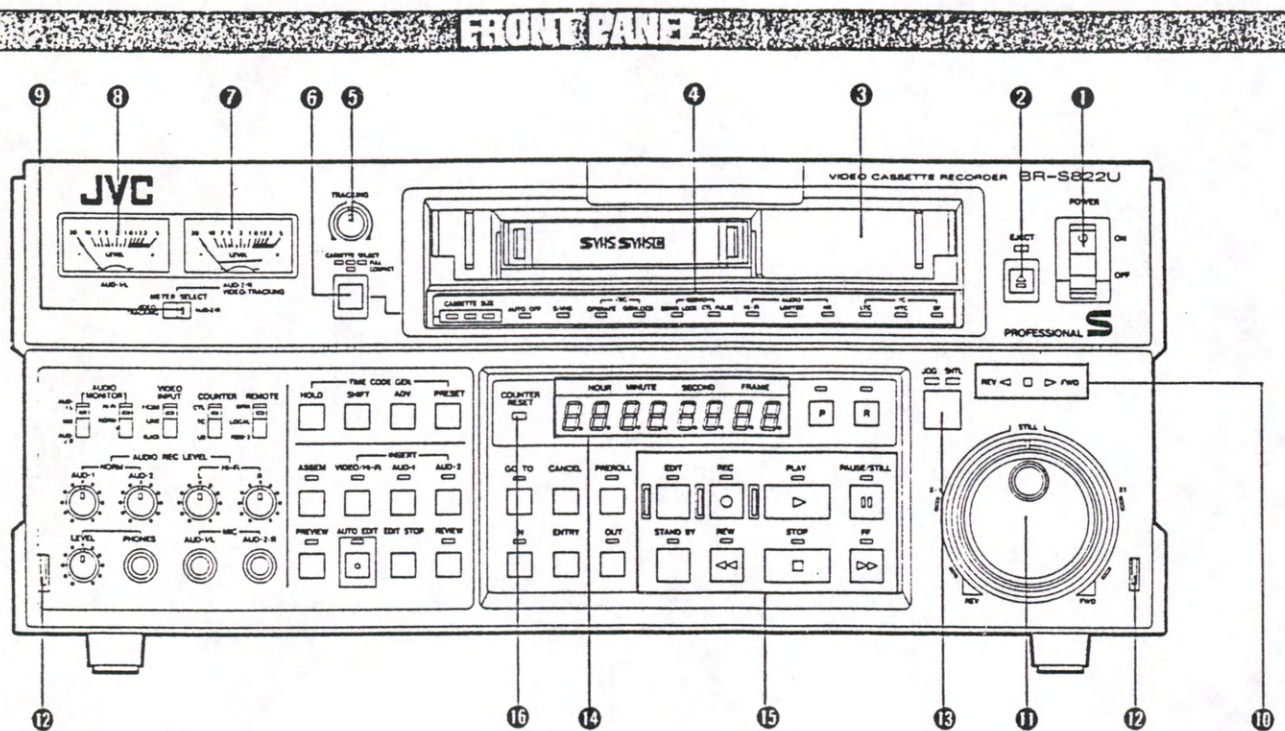
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1.3 MAIN DIFFERENCE BETWEEN 22 SERIES AND 11 SERIES

Item \ Model		BR-S822	BR-S811
Video performance	Horizontal resolution	400 lines	400 lines
	Video S-N ratio	47 dB (S-VHS mode)	46 dB (S-VHS mode)
	Pre/Rec amp	Installed on drum	Separate board
	Y/C separator (Recording)	Digital	Analog (early stage)/Digital (latter stage)
	Y comb filter (Playback)	Digital	Analog
	DOC circuit	Y: Digital, C: Analog	Analog (Y only)
	PB Y enhancer	○	X
	Auto H phase on/off	○	X
	Switching point masking	○	X
Operability	FF/REW time (T-120)	2 min. 30 sec.	4 minutes
	Search speed	±32 (F cassette mode)	±10
	LED counter	8 digits	5 digits
	On screen menu	○	X
	Tilttable operation panel	○	X
Convenient function	F/C cassette compatibility	○	X
	TBC	Plug-in (optional)	Separate unit (SA-T400)
	Black burst generator	○	X
	Black burst on screen recording	○	X
	Time code generator/reader	Plug-in (optional)	Separate unit (SA-F911)
	Tape selector	Type I, II, III, IV	X
Systematic connection	9-pin remote control	○	Separate unit (SA-F911)
	Y/C 629 output	X	○
	Y/C 688 output	Plug in (optional)	X
	Component output	○	X
	Swap editing control	○	X
	TBC remote control	○	X

Table 1-2 Main difference between 22 series and 11 series

CONTROLS AND CONNECTORS



1 POWER switch

- When power is ON, the time counter and level meters will be illuminated.

2 EJECT button with LED indicator

- Ejects the cassette (from any mode).
- The indicator lights while the cassette is being ejected.

3 Cassette loading slot

- Accepts either a compact or full-size S-VHS/VHS cassette according to the type selected with the CASSETTE SELECT button 6.

4 LED indicators

CASSETTE SIZE indicators

- Indicate whether the recorder is in the Full or Compact mode. When all three indicators are blinking, the recorder is ready to accept a full-size cassette. When only the center indicator is blinking, the recorder is ready to accept a compact cassette. Press the CASSETTE SELECT button 6 to change modes. When a cassette is inserted, the blinking will stop and the corresponding indicator(s) will remain continuously lit.

AUTO OFF indicator

- Lights when the unit malfunctions. All other controls are disabled.

S-VHS indicator

- Lights when an S-VHS or S-VHS-C cassette is inserted with the unit in the S-VHS mode, or when playing back a blank part of the tape.
- Blinks when S-VHS recording is attempted with a VHS cassette.

TBC indicators

(with optional SA-T22U TBC installed)

OPERATE: Lights when the TBC is in operation. A timebase-corrected signal is output.

GENLOCK: Lights when the TBC is in operation and locked to the external reference signal.

SERVO indicators

SERVO LOCK: Lights when the capstan and drum servos are locked to the reference signal.

CTL PULSE: Lights during playback of a tape with no control pulse recorded.

AUDIO indicators

Hi-Fi: Lights when the Hi-Fi REC circuit is ON (via menu setting) or when playing back Hi-Fi-recorded tapes.

LIMITER: Lights when the built-in audio limiter circuit is set to ON (via menu setting).

NR: Lights when the Dolby B* noise reduction circuit is set to ON (via menu setting).

TC (TIME CODE) indicators

(with optional SA-R22U TC [time code] generator/reader installed)

LTC: Lights green when LTC-recorded tapes are played back with the normal audio-2 track set for LTC use (via menu setting). If LTC is not picked up, the indicator lights orange. This indicator may also light green when normal-audio-recorded tapes are played back.

VITC: Lights when VITC-recorded tapes are played back or when recording a VITC signal.

DF: Lights when recording or playing back in the Drop-Frame mode.

5 TRACKING control

- Adjusts tracking. Turn in either direction until the tracking meter deflects all the way to the right.
- Normally leave in the center click-stop position.

6

CASSETTE SELECT button

- Press to select FULL or COMPACT. The corresponding indicator(s) will light.

7 AUD-2/R (VIDEO/TRACKING) level meter

- Indicates the audio level of the normal audio-2 or Hi-Fi right-channel signal during recording and playback.
- Functions as a video level meter during recording and as a tracking meter during playback when the METER SELECT switch 9 is set to VIDEO/TRACKING.

8 AUD-1/L level meter

- Indicates the audio level of the normal audio-1 or Hi-Fi left-channel signal during recording and playback.

9 METER SELECT switch

- Switches the AUD-2/R level meter 7 between audio level and video level indication.

AUD-2/R: Meter functions as the audio-2/Hi-Fi right-channel level meter.

VIDEO/TRACKING: Meter functions as a video level meter in recording, and as a tracking meter in playback.

10 Tape direction indicators

- Indicate the current tape direction.

▷: Forward

□: Still

◁: Reverse

11 JOG/SHUTTLE dials

- Dual concentric controls. The outer functions as a Shuttle ring, the inner as a Jog dial. The Jog and Shuttle modes can be entered directly from the Play, Still, FF, REW, or Stop modes.

SHUTTLE ring: Search speed can be varied continuously from 1/30 to 32 times normal (up to 10 times normal with C-size cassettes) in forward or reverse. Set to the center click-stop position to engage the Still mode.

JOG dial: Manual frame-by-frame search in either direction. Tape speed is determined by the speed of dial rotation. Releasing the dial engages the Still mode. Also used in edit point trimming, menu setting and TC/UB presetting.

12 Control panel lock release buttons

- To tilt the control panel, press these buttons and lift the panel at the same time. The panel can be tilted to 90° and locked at angles of 25°, 50°, and 75°.

13 JOG/SHUTTLE button with JOG/SHTL mode indicators

- Instantly re-activates the Shuttle mode with search speed determined by the current dial setting.

14 Time counter

- Shows tape time in hours, minutes, seconds, and frames.
- Displays edit-in and -out points.
- Displays user bits.
- Displays menu settings and warnings.

15 Operation buttons with LED indicators

PAUSE/STILL button

- Temporarily stops recording when pressed in the Record mode.
- Displays a still picture when pressed in the Play mode.

PLAY button

- Starts playback.
- Re-starts normal playback when pressed in the Still or Search mode.
- Starts recording when pressed together with the REC button.
- Starts editing when pressed together with the EDIT button in the Play mode (Run Editing).
- Re-starts recording when pressed in the Record-Pause mode.

REC button

- Starts recording when pressed together with the PLAY button.
- Outputs EE signals when pressed in the Play mode.
- Displays TC generator data when pressed in the Stop mode. (Released by pressing STOP button.)

EDIT button

- Starts editing when pressed together with the PLAY button in the Play mode.
- Outputs EE signals (selected with the Edit Mode Select buttons) when pressed on its own in the Play mode.
- Displays TC generator data when pressed in the Stop mode. (Released by pressing STOP button.)

STAND BY button

- Switches the recorder between the Standby-On and Standby-Off modes while the VCR is in the Stop mode. Standby-On is automatically engaged when the Stop button is pressed.

Standby-On: The tape is loaded and the drum is rotating. The indicator is lit.

Standby-Off: The tape is loaded but tape tension is reduced and the drum does not rotate. The indicator is not lit.

REW button

- Starts rewind when pressed in any mode.

STOP button

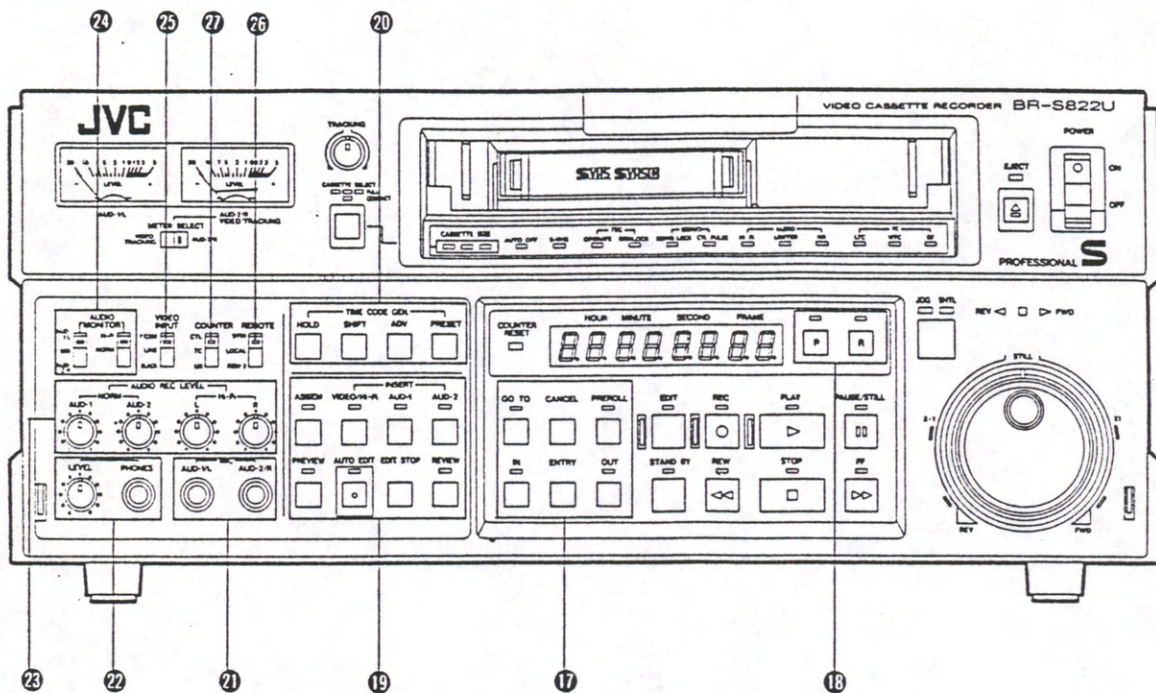
- Engages the Stop mode (Standby-On). The tape stops, but remains in the full-loaded position with the drum rotating.
- The STOP and STAND BY indicators will light.

FF button

- Starts fast forward when pressed in any mode.

16 COUNTER RESET button

- Resets the CTL counter to zero.
- Clears the entered edit point.
- The CTL counter will be reset even if this button is pressed in the TC mode.



17 Edit control buttons

PREROLL button with LED indicator

- Prerolls the tape by about 5 seconds.

CANCEL button

- Press together with the IN or OUT button to clear the edit point from memory.

GO TO button

- Press together with the IN or OUT button to access the IN or OUT point.

ENTRY button

- Press together with the IN or OUT button to enter an IN or OUT point.

IN/OUT buttons with LED indicators

- Press together with the ENTRY button to enter the IN or OUT point.
- Press either button on its own to display the IN or OUT point.
- Press simultaneously to display edit duration.
- Turn the JOG dial while holding either button to trim the IN or OUT point.

18 Player/Recorder select buttons

For swap editing via the 9-pin connector.

- Press P to operate the Player with this recorder's controls.
- Press R to operate this recorder.

19 Edit operation buttons with LED indicators

Edit mode select buttons

- To select the editing mode.

ASSEM: All input video and audio signals are recorded.

VIDEO/HI-FI: Inserts the video signal and the Hi-Fi audio signal together.

AUD-1: Inserts the normal audio-1 signal.

AUD-2: Inserts the normal audio-2 signal or the LTC signal.

REVIEW button

- Reviews the executed edit.

EDIT STOP button

- Stops automatic editing.

AUTO EDIT button

- Executes automatic editing.

PREVIEW button

- Previews the programmed edit.

20 Time Code setting buttons

To preset time code/user bit data (with optional SA-R22U TC generator/reader installed).

HOLD button

This button is only effective when the SA-R22U's PRESET/REGEN switch is set to PRESET.

- Holds the current counter data; the leftmost digit will blink.

SHIFT button

- Shifts the blinking digit to the right. (You can also shift the blinking digit in either direction by holding down the SHIFT button and turning the JOG dial.)

ADV (ADVANCE) button

- Advances the value of the blinking digit. (You can also change the value in either direction by holding down the ADV button and turning the JOG dial.)

PRESET button

- Transfers the data set with the HOLD, SHIFT, and ADV buttons to the time code generator.
- Automatically cancels the Hold mode.

21 MIC jacks (AUD-1/L, AUD-2/R)

- For microphone connection. Input signal switches from line to microphone.

22 PHONES jack/LEVEL control

- Connect a set of headphones to monitor sound recording.
- Adjust output level with the LEVEL control.

23 Hi-Fi L/R and NORM AUD-1/AUD-2 AUDIO REC LEVEL controls

- To separately adjust recording levels for the Hi-Fi left/right-channel signals and the normal (linear) audio-1/2 signals.
- Optimum level is the point where the corresponding meter's peak deflection is "0".

24 AUDIO MONITOR select switches

- To select the audio output for the PHONES jack and the AUDIO MONITOR OUT connector.
- The Hi-Fi/NORM switch also switches the audio level meters between Hi-Fi and NORMAL.

Hi-Fi: To monitor the Hi-Fi audio signals.

NORM: To monitor the normal audio signals.

AUD-1/L: To monitor the normal audio-1 or Hi-Fi left-channel signal.

MIX: To monitor the AUD-1/L and AUD-2/R signals together.

AUD-2/R: To monitor the normal audio-2 signal or Hi-Fi right-channel signal.

25 VIDEO INPUT select switch

- To select an input video signal for recording.
Y/C358: To record the signal input to the Y/C358 connector.

LINE: To record the signal input to the VIDEO IN LINE connector.

BLACK: To record the internally-generated black burst signal on a blank tape in preparation for insert editing. If set to this position during menu setting, on-screen information is output from all output connectors, not only the MONITOR OUT connector.

26 REMOTE select switch

- To select between remote and local control of the recorder.

9-PIN: For remote control via the rear panel 9-pin connector.

LOCAL: For direct control with the recorder's function buttons.

REM-2: For remote control via the optional 45-pin or RS-232C interface.

27 COUNTER select switch

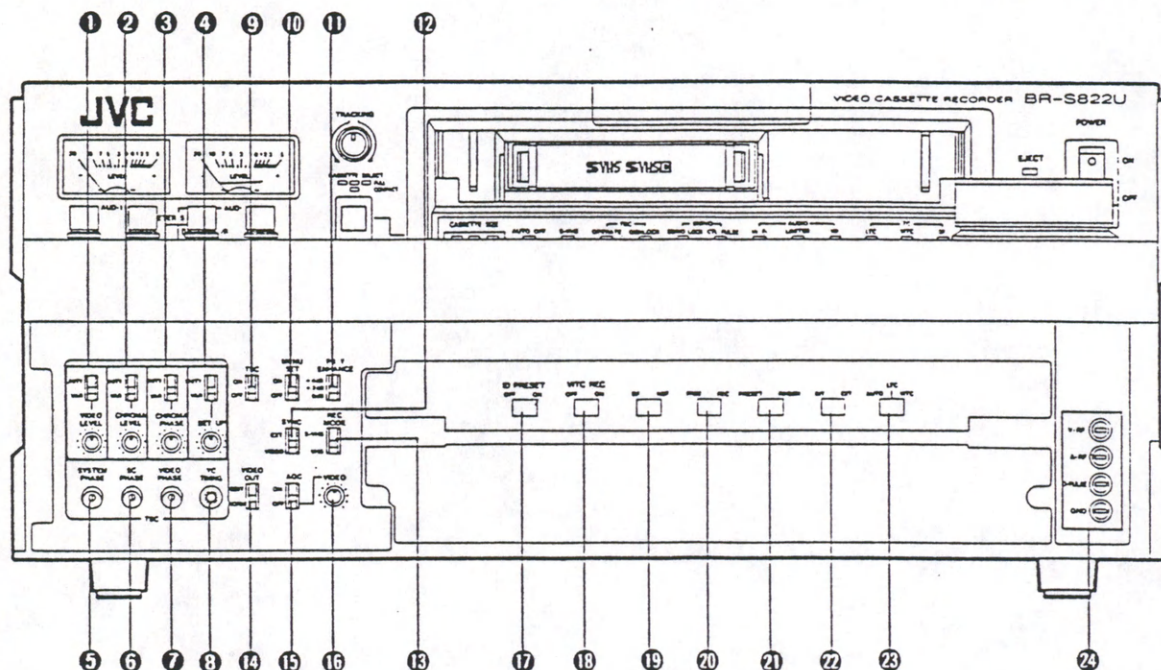
- To select the time counter display mode with the SA-R22U TC generator/reader installed. If this is not installed, CTL signals are displayed regardless of the switch setting.

CTL: CTL signals are displayed on the time counter.

TC: Time code signals are displayed on the time counter.

UB: User bits are displayed on the time counter.

FRONT SUB-PANEL



TBC CONTROLS

The controls in this section function when the optional SA-T22U TBC (time base corrector) is installed.

1 VIDEO LEVEL UNITY/VARIABLE select switch/level control

UNITY: The output signal's video level is the same as the playback signal. Normally set to this position.

VARIABLE: Allows you to adjust the output signal's video level with the VIDEO LEVEL control. Adjustment is possible within ± 3 dB.

2 CHROMA LEVEL UNITY/VARIABLE select switch/level control

UNITY: The output signal's chroma level is the same as the playback signal. Normally set to this position.

VARIABLE: Allows you to adjust the output signal's chroma level with the CHROMA LEVEL control. Adjustment is possible within ± 3 dB.

3 CHROMA PHASE UNITY/VARIABLE select switch/level control

UNITY: The output signal's chroma phase is the same as the playback signal.

VARIABLE: Allows you to adjust the output signal's chroma phase with the CHROMA PHASE control. Adjustment is possible within $\pm 30^\circ$.

4 SET UP VARIABLE/UNITY select switch/level control

UNITY: The output signal's setup level is the same as the playback signal.

VARIABLE: Allows you to adjust the output signal's setup level with the SET UP control. Adjustment is possible within ± 15 IRE.

5 SYSTEM PHASE control

- Adjusts the output signal's horizontal phase with respect to that of the reference input signal. Adjustment is possible within a range of ± 3 μ sec.

6 SC PHASE

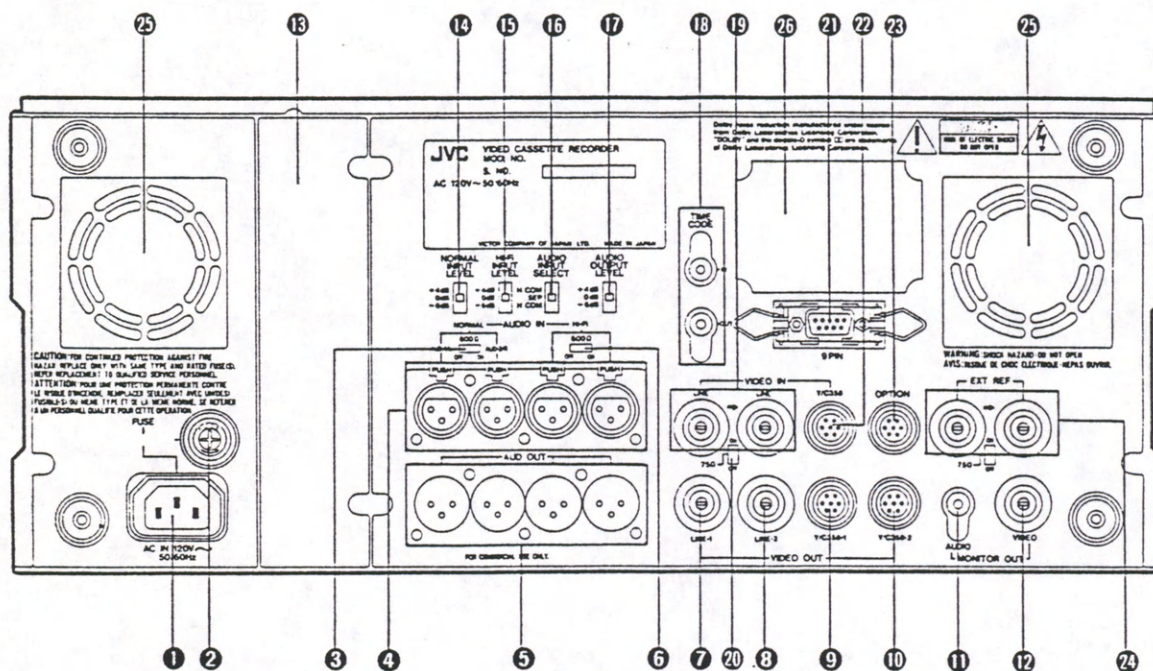
- Adjusts the output signal's subcarrier phase with respect to that of the reference input signal. Up to 15 rotations are possible with continuous variation over a range of $\pm 180^\circ$.

7 VIDEO PHASE control

- Adjusts the output signal's video phase with respect to the playback signal's H sync. Up to 15 rotations are possible with continuous variation over a range of ± 1.5 μ sec.

8 YC TIMING control

- Adjusts the output signal's C signal delay time with reference to the Y signal. Adjustable within ± 500 nsec.
- Normally set to "8".



- 1 AC IN socket**
 - Connect to 120 V AC, 50/60 Hz power outlet.
- 2 Fuse holder**
- 3 NORM AUDIO INPUT impedance select switch**
 - ON: 600 ohms.
 - OFF: 10 k-ohms. Normally set to this position.
- 4 Audio input connectors**
 - AUDIO IN NORMAL: Normal audio input connectors for Audio-1 and Audio-2.
 - AUDIO IN Hi-Fi: Hi-Fi audio input connectors for Left and Right.
- 5 Audio output connectors**
 - AUDIO OUT NORMAL: Normal audio output connectors for Audio-1 and Audio-2.
 - AUDIO OUT Hi-Fi: Hi-Fi audio output connectors for Left and Right.
- 6 Hi-Fi AUDIO INPUT impedance select switch**
 - ON: 600 ohms.
 - OFF: 10 k-ohms. Normally set to this position.
- 7, 8 VIDEO OUT LINE (1, 2) connectors**
 - The composite video signal is output from these connectors.
- 9, 10 VIDEO OUT Y/C358 (1, 2) connectors**
 - The Y/C358 signal is output from these connectors.
- 11 AUDIO MONITOR OUT connector**
 - The audio signal selected with the AUDIO MONITOR select switches is available at this connector.
- 12 VIDEO MONITOR OUT connector**
 - The composite video output signal is available at this connector. On-screen information is also supplied.
- 13 Expansion slot**
 - For installation of optional interface (SA-K28U or SA-K27U).
- 14 NORMAL INPUT LEVEL select switch**
 - To select -6 dB, 0 dB, or +4 dB according to the level of the normal audio input signal. Both channels are switched simultaneously.
- 15 Hi-Fi INPUT LEVEL select switch**
 - To select -6 dB, 0 dB, or +4 dB according to the level of the Hi-Fi audio input signal. Both channels are switched simultaneously.
- 16 AUDIO INPUT SELECT switch**
 - H COM: "Hi-Fi Combined" recording. Set to this position to record audio signals input to the AUDIO IN Hi-Fi connectors on both the Hi-Fi and Normal audio tracks.
 - SEP: "Separate" recording. Set to this position to record audio signals input to the AUDIO IN Hi-Fi and NORMAL connectors separately on the Hi-Fi and Normal audio tracks.
 - N COM: "Normal Combined" recording. Set to this position to record audio signals input to the AUDIO IN NORMAL connectors on both the Hi-Fi and Normal audio tracks.

17 AUDIO OUTPUT LEVEL select switch

- To select -6 dB, 0 dB, or +4 dB according to the input level of connected audio equipment. All four audio channels are switched simultaneously.

18 TIME CODE IN/OUT connectors

Set menu item #206 to "01 – LTC" to record LTC time codes on the normal audio-2 track.

- Connect a time code generator to the IN connector for external time code recording.
- Connect a time code reader to the OUT connector for external time code reading.

19 VIDEO IN LINE connectors

- The composite video signal is input to the left connector.
- To output the loop-through signal to another unit, set the 75-ohm terminating switch to OFF.

20 75-Ohm terminating switch

ON: The loop-through signal is terminated at the BR-S822U.

OFF: The loop-through signal is output to another unit.

21 9-PIN connector

- Connect to an RS-422 9-pin serial remote control unit or to the RS-422 9-pin connector of a feeder for swap editing.

22 VIDEO IN Y/C358 connector

- The Y/C358 signal is input to this connector.

23 OPTION connector

- Delivers the Y/C688 signal (with optional SA-E68U Output board installed) to the DUB IN connector of 3/4" U-VCR machines.

24 EXT REF connectors with 75-ohm terminating switch

- Supply the reference signal (either black burst signal or composite video) to the left connector and set the 75-ohm terminating switch to ON.
- To output a loop-through signal to another unit, set the 75-ohm terminating switch to OFF.

NOTE:

- When using the SA-T22U, do not use a black-and-white signal or sync signal without burst as the reference signal, otherwise the intended synchronization will not be obtained.

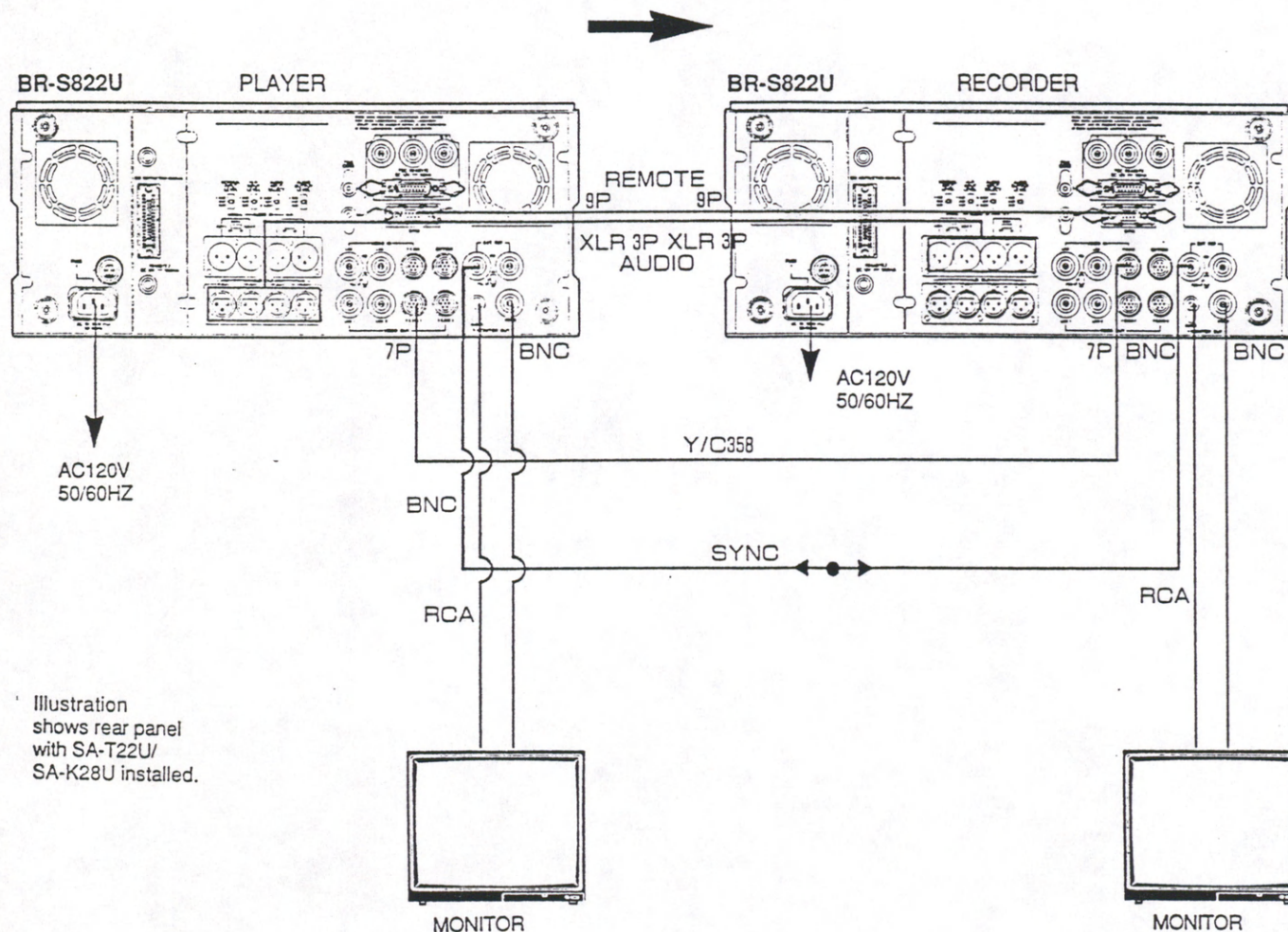
25 Fans

26 Expansion slot

For installation of COMPONENT OUT connector board when optional SA-T22U TBC is installed.

EDITING CONNECTIONS

For Swap Editing



NOTES:

- To avoid distortion of the recorder's playback signal while the player is in the search mode, connect an external sync signal generator.
- If the player doesn't have an auto H-phase function, editing with the external sync signal may produce skew at the top of the edited picture.
- To avoid distortion or missing colors caused by unstable input signals, the player's signal should be processed by a TBC. (If you are using the BR-S822U or BR-S622U as the player, install the optional TBC board SA-T22U or connect an external TBC to the player. Set the player's TBC switch to ON.)

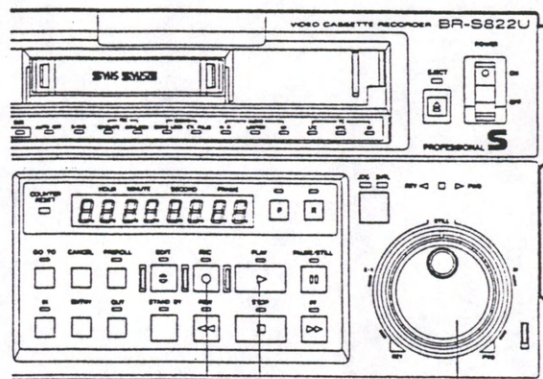
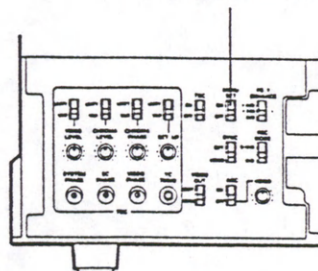
SETUP MENU

OPERATION

By engaging the Menu Set mode, you can cancel any preset functions that you don't require or change certain parameters as desired.

1. Set the MENU SET switch to ON.
 - The set-up menu appears on the monitor screen. The counter display will also switch to the Menu Set mode.
 - The Menu number (000) for the first item will blink.
2. Turn the Jog dial to locate the item you want to set.
 - Turning the dial clockwise increments the setting items (000→001→100, etc.); turning it counterclockwise, decrements the setting items.
3. When you locate an item you wish to change, press PLAY.
4. Press PLAY again to change the setting.
5. To continue setting, repeat steps 2 to 4.
6. Press REC to store the new settings.
7. To exit the menu, set the MENU SET switch to OFF.

MENU SET switch



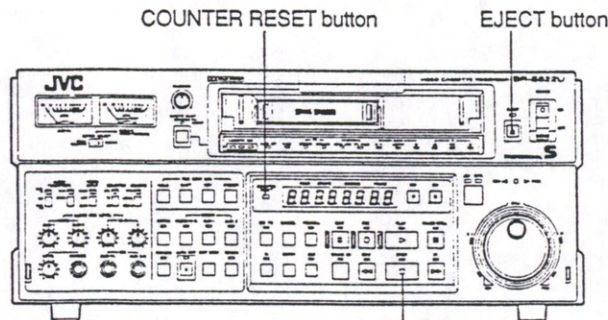
REC button
[DATA STORE]

PLAY button
[DATA SELECT]

Jog dial
[MENU SELECT]

NOTE:

- All menu items can be automatically restored to their initial settings. To do this, first switch off the VCR's power. Then, while pressing STOP, COUNTER RESET, and EJECT simultaneously, switch on the power. All menu items will have been restored to their initial settings.

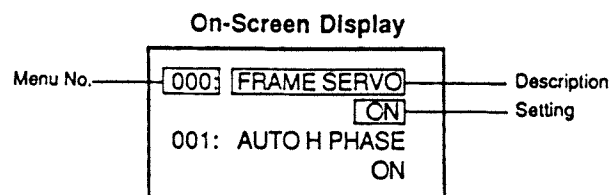
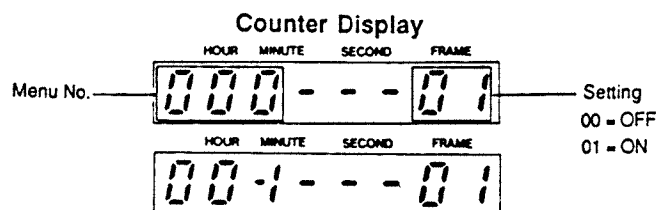


COUNTER RESET button

EJECT button

STOP button

MENU SETTINGS



NOTE:

For items with more setting variations, 02, 03 ... are displayed.
 In such cases, 00/01 does not mean OFF/ON.

Blinking: Item ready to be set

(Initial settings are in brackets.)

Menu No.		On-Screen Description	Settings		Explanation
			Counter	On-Screen	
SERVO	000	FRAME SERVO	00 [01]	OFF [ON]	OFF: To defeat Frame Servo. When random-interlaced or low-S/N video signals are used, set to OFF. ON: To use Frame Servo. Normally set to ON.
	001	AUTO H PHASE	00 [01]	OFF [ON]	OFF: To defeat Auto H-Phase Lock. Set to OFF for animation or CG recording. ON: To use Auto H-Phase Lock. Normally set to ON.
VIDEO	100	SWITCHING POINT *1	[00] 01 02	[REC6.5H, PB4.5H] REC6.5H, PB5.5H REC2.25H, PB1.25H	Selects head switching point. REC6.5H, PB4.5H: To position head switching point 6.5H ahead of V sync in recording, and to shift it 2H in playback (1H lower than normal). Normally use this setting. REC6.5H, PB5.5H: To position head switching point 6.5H ahead of V sync in recording, and to shift it 1H in playback. REC2.25H, PB1.25H: To position head switching point 2.25H ahead of V sync in recording, and to shift it 1H in playback. Use this setting when you want a lower switching point for closed-circuit systems.
	101	S-VHS REC. EQ.	00 [01] 02 03	TAPE TYPE-1 [TAPE TYPE-2] TAPE TYPE-3 TAPE TYPE-4	Selects video frequency response according to the characteristics of the tape used. TAPE TYPE-1: S-VHS master tape. TAPE TYPE-2: Professional-S tape or other double-coated tapes. TAPE TYPE-3: Do not use this setting. TAPE TYPE-4: Do not use this setting.
	102	Y-688 MODE	[00] 01	[CONV.] SP	Selects the mode of the signal output via rear panel OPTION (Y-688) connector. (Effective with SA-E68U board) CONV.: To output Y-688 dubbing signal to conventional 3/4" U-VCR machines. SP: To output Y-688 dubbing signal to 3/4" U-VCR SP machines.
	103	WIDE ASPECT ID REC.	[00] 01 02	[AUTO] WIDE NORM.	Selects recording in wide aspect format (16:9 aspect ratio) or normal format (4:3 aspect ratio). AUTO: Automatically detects wide aspect ID of input signal (Y/C input only) and records in wide aspect format. WIDE: Records in wide aspect format regardless of the format of input signal. When recording wide-aspect pictures via composite input, use this setting. NORM.: Records in normal aspect format regardless of the format of input signal.

Menu No.		On-Screen Description	Settings		Explanation
			Counter	On-Screen	
VIDEO	104	COMPONENT OUT LEVEL	[00]	[LOW] HIGH	Selects the level of component signals output via rear panel Y/R-Y/B-Y connectors. (Effective with SA-T22U) LOW: To output component signals to MII machines. HIGH: To output component signals to Betacam machines.
			01		
AUDIO	200	Hi-Fi AUDIO REC.	00 [01]	OFF [ON]	OFF: To defeat Hi-Fi audio recording. ON: To record Hi-Fi audio.
	201	NORM. AUDIO DOLBY NR	00 [01]	OFF [ON]	OFF: To defeat Dolby NR circuit for normal audio. ON: To activate Dolby NR circuit for normal audio.
	202	AUDIO LIMITER	00 [01]	OFF [ON]	OFF: To defeat audio limiter for normal audio tracks. ON: To activate audio limiter for normal audio tracks to avoid over-level recording. (Audio recording level adjustment is possible with limiter ON.)
	203	AUDIO OUT	[00] 01 02	[SEP.] Hi-Fi NORM	Selects output signals via rear panel AUDIO OUT connectors. SEP.: To output as labelled: normal audio from NORMAL AUD-1/AUD-2, Hi-Fi audio from Hi-Fi L/R. Hi-Fi: To output Hi-Fi audio from all connectors: NORMAL AUD-1 outputs Hi-Fi left-channel signal and NORMAL AUD-2 outputs Hi-Fi right-channel signal. NORM: To output normal audio from all connectors: Hi-Fi L outputs normal audio-1 signal and Hi-Fi R outputs normal audio-2 signal.
	204	Hi-Fi OUT AT SEARCH	[00] 01	[MUTE] NORM	Selects output signals via rear panel Hi-Fi AUDIO OUT connectors during search. MUTE: To output muted Hi-Fi audio. NORM.: To output normal audio.
	205	AUD-1 REC.	[00] 01	[AUD-1] AUD-1/2 MIX	Selects audio signals to be recorded on the normal audio-1 track. AUD-1: Audio signals input to AUD-1 are recorded. AUD-1/2 MIX: Mixed audio signals input to AUD-1 and AUD-2 are recorded. (Levels are controlled independently with the corresponding control.) Nothing is recorded on the normal audio-2 track unless menu item #206 is set to "01 - LTC".
	206	AUD-2/LTC *2	[00] 01	[AUD-2] LTC	Selects signals to be recorded on the normal audio-2 track. AUD-2: Audio signals input to AUD-2 are recorded. LTC: LTC signal is recorded.
SYSTEM	300	DIRECT EJECT	00 [01]	DISABLE [ENABLE]	DISABLE: EJECT command is accepted only from Stop mode. ENABLE: EJECT command is accepted from any mode.
	301	DIRECT SEARCH	00 [01]	DISABLE [ENABLE]	DISABLE: Jog/Shuttle dials do not function unless JOG/SHTL button is pressed first. ENABLE: Jog/Shuttle dials function directly from Stop, Play, Still, FF and REW modes.
	302	AUTO REC. PREROLL	00 [01]	DISABLE [ENABLE]	DISABLE: Enters Record-Pause mode without preroll. Picture will be distorted at record-start point. ENABLE: Enters Record-Pause mode with preroll of about 3 seconds.
	303	WARNING INHIBIT	[00] 01	[OFF] ON	OFF: Malfunctions are detected for warning indications. Normally keep set to this position. ON: Detection of malfunctions is inhibited. No warning indication is available.

Menu No.	On-Screen Description	Settings		Explanation
		Counter	On-Screen	
SYSTEM	304 RECORDING INHIBIT	[00] 01	[OFF] ON	OFF: Recording is possible with cassettes with safety tab in place. ON: Recording is inhibited regardless of the presence of safety tab. Use this position if the VCR is used only as a player.
	305 REPEAT REC.	[00] 01	[DISABLE] ENABLE	This setting is for manufacturer adjustment purposes only. Always keep set to DISABLE.
	306 LONG PAUSE	00 [01]	DISABLE [ENABLE]	DISABLE: To defeat Long Pause function. ENABLE: To use Long Pause function in Standby-On, Still and Record-Pause modes. (Long Pause parameters are selected with menu items #307, #308 and #309.)
	307 LONG PAUSE TIME	00 01 02 03 04 05 06 [07]	1 SEC 10 SEC 30 SEC 1 MIN 2 MIN 3 MIN 4 MIN [5 MIN]	With menu item #306 set to ENABLE, selects the length of time before normal Pause (Standby-On, Still and Record-Pause) mode changes to Long Pause.
	308 LONG PAUSE (STILL)	00 01 [02]	STANDBY-OFF T. RELEASE [STEP FWD]	Selects the contents of Long Pause mode. (After the time set with menu item #307 expires in Still or Record-Pause mode, the VCR operates as specified.) STANDBY-OFF: Enters Standby-Off mode. T.RELEASE: Tape tension is reduced. Still pictures continue to be available. STEP FWD: Tape advances in slow-motion for about 2 seconds (about 2 frames). This action is repeated 5 times at the time intervals set with menu item #307. The VCR enters the Standby-Off mode after the final interval.
	309 LONG PAUSE (STOP)	[00] 01 02	[STANDBY-OFF] T. RELEASE STEP FWD	Selects the contents of Long Pause mode. (After the time set with menu item #307 expires in the Standby-On mode, the VCR operates as specified.) STANDBY-OFF: Enters Standby-Off mode. T.RELEASE: Tape tension is reduced. STEP FWD: Tape advances in slow-motion for about 2 seconds (about 2 frames). This action is repeated 5 times at the time intervals set with menu item #307. The VCR enters the Standby-Off mode after the final interval.
	310 STANDBY-OFF MODE	00 [01] 02	DRUM ON [DRUM OFF] UNLOAD	Selects the status of Standby-Off mode. DRUM ON: Head drum continues to rotate with tape loaded. DRUM OFF: Head drum stops rotating with tape loaded. UNLOAD: Head drum stops rotating and tape unloads.
	311 MODE AT TAPE BEGIN	[00] 01	[SHORT-FF] PLAY	Selects the mode entered when the beginning of the tape is detected. SHORT-FF: Fast-forwards the leader section and enters Standby-On mode. PLAY: Enters Play mode.
	312 MODE AT TAPE END	[00] 01	[SHORT-REW] REW	Selects the mode entered when the end of the tape is detected. SHORT-REW: Rewinds the leader section and enters Standby-On mode. REW: Rewinds to the beginning of tape and enters Standby-On or Play mode depending on the setting of menu item #311.

Menu No.	On-Screen Description	Settings		Explanation
		Counter	On-Screen	
SYSTEM	313 PB•PB/EF	00 [01]	PB/EE [PB]	Selects output signal in the mode specified with menu item #314. PB/EE: Outputs EE signal. PB: Outputs playback signal.
	314 PB/EE MODE	[00] 01	[STOP/FF/REW] STOP	Selects the mode in which EE signal is output. STOP/FF/REW: EE signal is output in Stop, FF and REW modes. STOP: EE signal is not output in FF and REW modes.
	315 LOCAL FUNCTION	[00] 01 02 03	[STOP,EJECT] STP,EJ,PLY,FF, RW,STL ALL ENABLE ALL DISABLE	Selects functions that can be locally operated when front panel REMOTE switch is set to 9PIN or REM-2.
	316 9PIN CMD FUNCTION	[00] 01	[ALL DISABLE] STOP,EJECT	Selects 9-pin remote control commands that are acceptable when front panel REMOTE switch is set to LOCAL. ALL DISABLE: Accepts no command from 9-pin remote control. STOP,EJECT: Accepts STOP and EJECT commands only. (Note: With some remote controls, no command is accepted.)
	317 9PIN DEVICE TYPE ID	[00] 01 02 03	[JVC SVHS-1] JVC SVHS-2 OTHER TYPE-1 OTHER TYPE-2	Selects device type ID returned from VCR to 9-pin remote control in response to its request. JVC SVHS-1: Use this setting with BR-S622DXU/BR-S822DXU. JVC SVHS-2: Use this setting if SA-F911U is included in the system. OTHER TYPE-1/OTHER TYPE-2: Consult a JVC dealer.
	318 TC DATA W/O TC BOARD	[00] 01	[TC MISSING] CTL DATA	Selects VCR's response to 9-pin remote control when remote control requests time code data when TC board is not installed. TC MISSING: VCR returns code meaning TC MISSING. CTL DATA: VCR returns substitute CTL data.
	319 TAPE MAX SPEED	[00] 01 02	[X70] X32 X16	Selects maximum tape speed. (FF and REW speeds also correspond to this setting. In the 70x mode, the EE signal is output. In the 32x and 16x search modes, the playback signal is output. The CTL signal is not output in the 16x search mode.)
	320 PREROLL TIME	00 : [05] : 15	0 SEC : [5 SEC] : 15 SEC	Selects preroll time in one-second steps from 0 to 15 seconds.
	321 TIME REF. FOR PREROLL	00 [01]	CTL [TC]	Selects time count reference for preroll in TC operation. CTL: Refers to CTL counts. Preroll is possible even when time codes are missing. TC: Refers to time codes.
	322 IN POINT AUTO ENTRY	00 [01]	NOT ENTERED [ENTERED]	Activates or defeats automatic IN point entry function. NOT ENTERED: IN point is not entered automatically by pressing PREROLL button. ENTERED: IN point is entered automatically by pressing PREROLL button if no IN point has been previously entered.
	323 MODE AFTER PREROLL	[00] 01	[STOP] STILL	STOP: Enters Stop mode after preroll is completed. STILL: Enters Still mode after preroll is completed.

Menu No.	On-Screen Description	Settings		Explanation
		Counter	On-Screen	
SYSTEM	324 EDIT FIELD	[00] 01	[1st] 2nd	1st: Starts recording/editing on the first field and ends on the second field. 2nd: Starts recording/editing on the second field and ends on the first field. Use this setting when inserting two pictures in one frame for animation.
	325 CTL COUNTER MODE	[00] 01	[±9H] 24H	±9H: Counter shows from -9 to +9 hours in CTL mode. 24H: Counter shows from 0 to 24 hours in CTL mode.
	326 CTL COUNTER MEMORY	[00] 01	[OFF] ON	OFF: No counter memory function is available. ON: Enters Stop mode at CTL counter reading of zero in FF and REW modes.
	327 CTL CLEAR AT EJECT	00 [01]	DISABLE [ENABLE]	DISABLE: CTL counter is not reset when cassette is ejected. ENABLE: CTL counter is reset when cassette is ejected.
	328 EDIT POINT CLEAR	00 [01]	DISABLE [ENABLE]	DISABLE: IN and OUT points are not automatically cleared. ENABLE: IN and OUT points are automatically cleared after execution of an edit with AUTO EDIT button.
	329 OUT POINT RETURN	00 [01]	DISABLE [ENABLE]	Activates or defeats OUT Point Return function. (After execution of an edit with AUTO EDIT button, tape automatically returns to the OUT point.)
	330 VIDEO EDIT DELAY	[00] 01	[7 FRAMES] 3 FRAMES	Selects the length of time before video recording starts after reception of EDIT command.
	331 AUDIO EDIT DELAY	[00] 01	[7 FRAMES] 3 FRAMES	7 FRAMES: To delay audio signals by 7 frames in editing for accurate synchronization with video frames. Normally use this setting. 3 FRAMES: To delay audio signals by 3 frames. Use this setting only when the VCR is controlled via RM-86U remote control units.
	332 CASSETTE SEL. INHIBIT	[00] 01	[OFF] ON	OFF: Cassette size selection is possible with the CASSETTE SELECT button on the front panel. ON: Cassette size selection is inhibited.
	350 SWAP VTR	[00] 01 02 03 04 05 06 07 08 09	[AUTO] CR-850U AUTO SA-F911U BR-S822DXU KR-M440U KR-M820U/M800UAS KR-M840U KR-M860U OTHER SVHS	Selects player type for swap editing. Normally use AUTO position.
	351 SYNCHRONIZE	00 [01]	DISABLE [ENABLE]	Activates or defeats Capstan Bump function in swap editing.
	352 SYNCHRONIZED VTR	[00] 01	[RECORDER] PLAYER	RECORDER: Applies capstan bump to recorder in swap editing with menu item #351 set to ENABLE. PLAYER: Applies capstan bump to player.
	353 SYNC GRADE	[00] 01 02 03	[ACCURATE] ±1 FRAME ±2 FRAME ROUGH	Selects editing accuracy after capstan bump. ACCURATE: In-phase editing at 0 frame accuracy. ±1 FRAME: In-phase editing at ± 1 frame accuracy. ±2 FRAME: In-phase editing at ± 2 frame accuracy. ROUGH: Editing starts when in-phase status is reached.
	354 SYNC GRADE AT RE-TRY	[00] 01	[NO CHANGE] DOWN	NO CHANGE: Applies same editing accuracy as set with menu item #353 when edit is re-tried. DOWN: Lowers editing accuracy of re-tries

Menu No.		On-Screen Description	Settings		Explanation
			Counter	On-Screen	
SYSTEM	355	AUTO-EE	[00] 01	[RECORDER ONLY] AUTO-EE	RECORDER ONLY: EE output is not available when "P" is pressed in swap editing. AUTO-EE: Recorder automatically switches to EE mode when "P" is pressed in swap editing. Convenient in one-monitor editing.
TIME CODE	400	VITC POSITION-1	00 ⋮ [06] ⋮ 15	10LINE ⋮ [16LINE] ⋮ 25LINE	Selects the horizontal scanning line on which VITC data is stored. Selectable from line 10 to line 25 in the vertical blanking interval. • Do not select line 17 in S-VHS recording as this is reserved for AUTO EQ. • When using the SA-T22U TBC board, set above line 12.
	401	VITC POSITION-2	00 ⋮ [08] ⋮ 15	10LINE ⋮ [18LINE] ⋮ 25LINE	Selects the horizontal scanning line on which VITC data is stored. Selectable from line 10 to line 25 in the vertical blanking interval. (Two lines per field are used to store VITC data.) • Do not select line 17 in S-VHS recording as this is reserved for AUTO EQ signal. • When using the SA-T22U TBC board, set above line 12.
	402	CTL DROP FRAME	[00] 01 02	[TCG SETTING] NON DROP DROP	Selects the mode of CTL counter data. TCG SETTING: With TC board installed, CTL counter operates in the mode selected with TC board's DF/NDF switch. (If this setting is used without TC board, non-drop-frame mode is selected.) NON DROP: CTL counter operates in non-drop-frame mode. DROP: CTL counter operates in drop-frame mode.
	403	TCG REGEN MODE	[00] 01 02	[TC & UB] TC UB	Selects code data to be regenerated in Internal Regen mode (with TC board's INT/EXT switch set to INT and PRESET /REGEN switch set to REGEN.) TC & UB: Records both time code and user bit data in Regen mode. TC: Records time code data in Regen mode and user bit data in Preset mode. UB: Records user bit data in Regen mode and time code data in Preset mode.
	404	TC SOURCE AT REGEN	[00] 01	[LTC] VITC	Selects the type of reference time code in the Regen mode. LTC: Reference code is LTC. VITC: Reference code is VITC.
	405	LTC OUT (REGEN)	[00] 01	[OFF TAPE] TCG	Selects output signal from TIME CODE OUT connector while playback is in progress in Internal Regen mode. OFF TAPE: Outputs time code signal picked up from tape. TCG: Outputs time code signal regenerated by TC generator.
	406	U-BIT BINARY GROUP	[00] 01 02 03	[NOT SPECIFIED] ISO CHAR. UNASSIGNED-1 UNASSIGNED-2	Selects character set configuration to use TC generator's user bits. NOT SPECIFIED: Character set configuration is not specified. ISO CHAR.: 8-Bit character set conforming to ISO 646 and ISO 2022 (with binary group flags at bit counts 43 and 59 in LTC; at 55 and 75 in VITC.) UNASSIGNED-1: Undefined. UNASSIGNED-2: Undefined.
	407	PHASE CORRECTION BIT	00 [01]	OFF [ON]	Selects recording of LTC phase correction bit (parity bit for bit error check). OFF: Not recorded. (Use this setting if 10s readout is not correct with external TC reader connected.) ON: Recorded.

Menu No.		On-Screen Description	Settings		Explanation
			Counter	On-Screen	
TIME CODE	408	VITC LINE	[00] 01	[VITC MIX] CLEAN ONLY	Selects whether lines set with menu items #400 and #401 are to be cleaned in recording. VITC MIX: VITC is recorded after lines are cleaned. CLEAN ONLY: Lines are cleaned.
	409	EXT REGEN TC	[00] 01	[LTC] VITC	Selects the type of externally input reference time code in External Regen mode. LTC: To use LTC via TIME CODE IN connector. VITC: To use VITC via VIDEO IN connector.
	410	AUTO REGEN MODE	[00] 01 02 03	[ASM+INS] ASM INS OFF	Selects the edit mode in which time codes are recorded automatically in Regen mode regardless of PRESET/REGEN switch setting in automatic editing. ASM+INS: Records in Regen mode in both Assemble and Insert modes. ASM: Records in Regen mode in Assemble mode only. INS: Records in Regen mode in Insert mode only. OFF: Records in the mode specified by PRESET/REGEN switch.
ON-SCREEN	500	ON-SCREEN DISPLAY	00 [01]	OFF [ON]	OFF: No data is displayed on-screen. ON: Data is displayed on-screen.
	501	CHAR. H-POSITION	[00] 08	[00] 8	Adjusts on-screen VCR data display position in the horizontal direction. (Not effective when menu item #504 is set to 02.) 0: VCR data is displayed at the rightmost position. 1 - 8: Display position shifts to the left with increasing numbers.
	502	CHAR. V-POSITION	[00] 09	[00] 9	Adjusts on-screen VCR data display position in the vertical direction. (Not effective when menu item #504 is set to 02.) 0: VCR data is displayed at the bottom of screen. 1 - 9: Display position shifts up with increasing numbers.
	503	CHAR. BACKGROUND	[00] 01 02	[BORDER] SEMI. BLACK	BORDER: Displays bordered characters. SEMI.: Displays semi-transparent characters. BLACK: Displays characters on black background.
	504	INFORMATION	[00] 01 02	[TIME] TIME & MODE EDIT DATA	Selects available on-screen information. TIME: Time counter data. TIME & MODE: Time counter data, operation mode and Jog/Shuttle tape speed. EDIT DATA: Edit data in swap editing.
	508	MONITOR OUT	[00] 01	[NORMAL] BLACK	NORMAL: Outputs composite video signal. BLACK: Outputs the black burst signal in any mode. On-screen data display is not available with this setting.
TBC	600	TBC FREEZE	[00] 01	[DISABLE] ENABLE	Selects the mode of still pictures in TBC operation. DISABLE: Outputs normal still pictures. ENABLE: Outputs 'freeze' still pictures from TBC's field memory when PAUSE/STILL button is pressed while in Play mode. This is effective only in LOCAL operation.
	601	V BLANK MASK	[00] 01	[OFF] ON	Activates or defeats vertical blanking interval masking function in TBC operation. OFF: No masking function. ON: Masks the entire vertical blanking interval in playback to erase VITC. VITC readout is impossible with this setting.
	602	DNR	00 [01]	OFF [ON]	Activates or defeats operation of optional Digital Noise Reducer. (Only effective with optional SA-T22U/SA-N22W installed.) OFF: Playback bypass DNR. ON: Playback through DNR. This setting is effective only when the VIDEO OUT select switch on the front sub-panel is set to "NORM" and the TBC switch is set to "ON"; otherwise, DNR will not function even with this menu item set to "ON".
	607	FREEZE HOLD	00 [01]	DISABLE [ENABLE]	Activates or defeats Freeze picture hold function. (Only effective with optional SA-T22U installed.) DISABLE: No freeze picture hold function is available. ENABLE: Outputs freeze still picture in Stop, Eject, FF or REW modes. (Only effective with menu item #600 TBC FREEZE set to "01-ENABLE".)

*1: When you set this item to "02-REC 2.25 H/PB 1.25H" in recording, be sure to set it to this position when playing back the tape in the TBC mode.

*2: When playing back a tape with no LTC recorded on the normal audio-2 track, set this item to "00 - AUD-2".

ROM VERSION/HOUR METER DISPLAY

By engaging the Menu Set mode, you can also check the numbers of device ROMs and the hour meter.

1. Set the MENU SET switch to ON.
 - The set-up menu appears on the monitor screen. The counter display will also switch to the Menu Set mode.
 - The Menu number (000) for the first item will blink.
2. Turn the Jog dial to locate items with numbers in the order of 900.
 - For quicker location, turn the Jog dial counterclockwise.

Counter Display

900 - - - 01

901 - - - 01

902 - - - 01

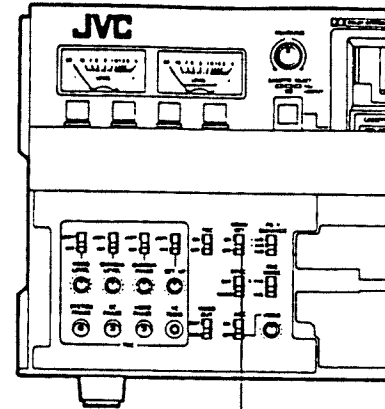
903 - 0000

908 - 0000

909 - 0000

910 - 0000

911 - 0000



MENU SET switch

On-Screen Display

900:SYSCON ROM Ver. 01
 901:MECHACON ROM Ver. 01
 902:OPERATION ROM Ver. 01
 903:SLOT ROM Ver. NO CONNECT 00
 AVM/OS ROM Ver. 04

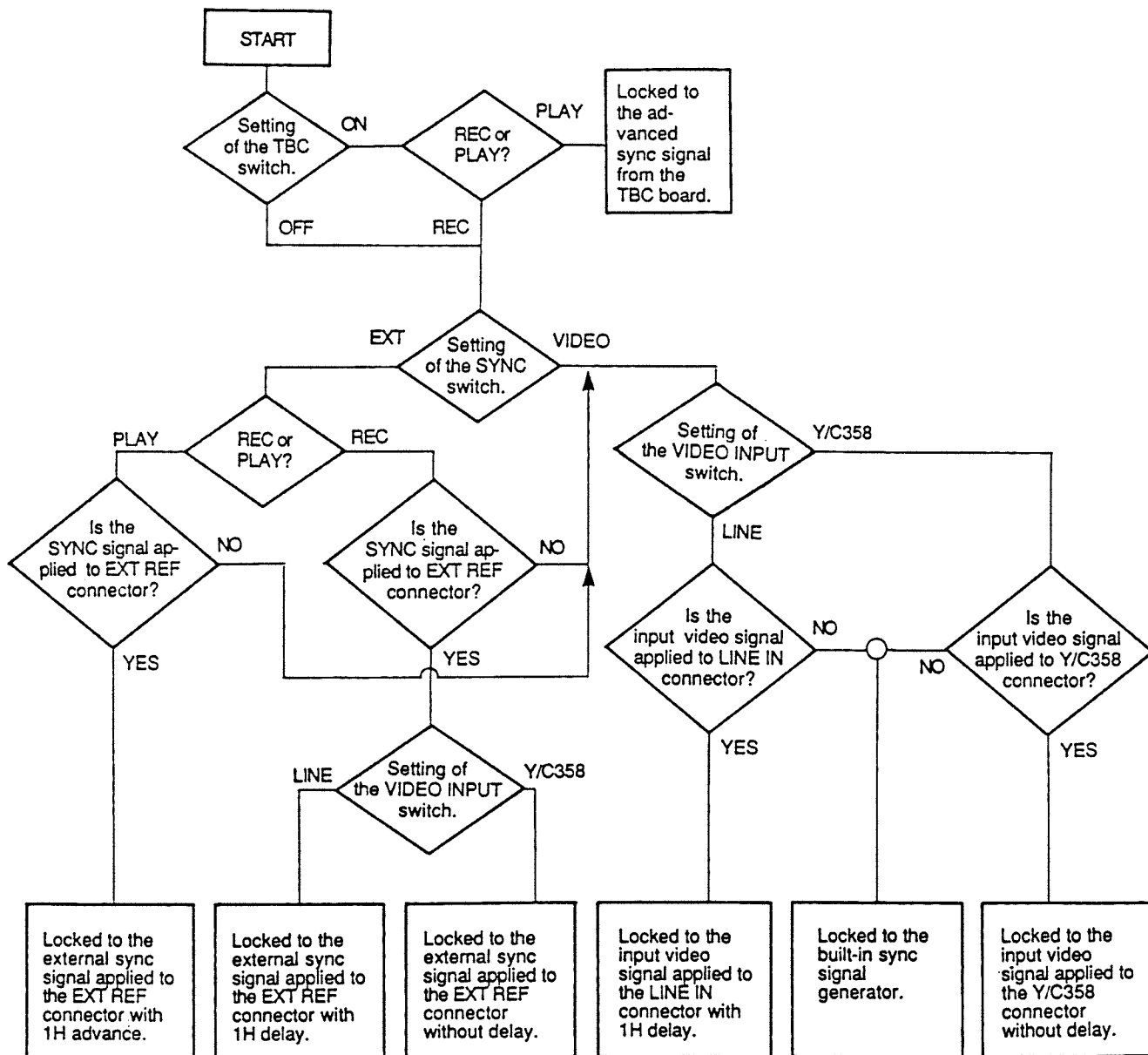
908:POWER HOUR METER 0000H
 909:DRUM HOUR METER 0000H
 910:CAP HOUR METER 0000H
 911:REEL HOUR METER 0000H

1.4.2 How to reset hour meter

When the capstan motor, drum assy or reel motor is replaced, reset the hour meter corresponding to the replaced part in the following manner.

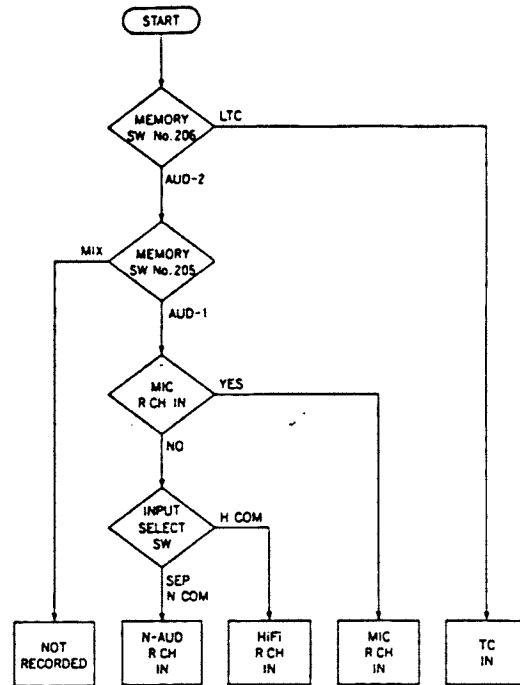
1. Set the MENU SET switch on the back of the operation panel to ON position in order to turn on the hour meter.
2. Set the blinking indication to the hour meter that needs to reset.
3. Press the COUNTER RESET button, the EJECT button and the STOP button simultaneously. The hour meter is consequently reset.

REFERENCE SYNC SIGNALS FOR RECORDING AND PLAYBACK

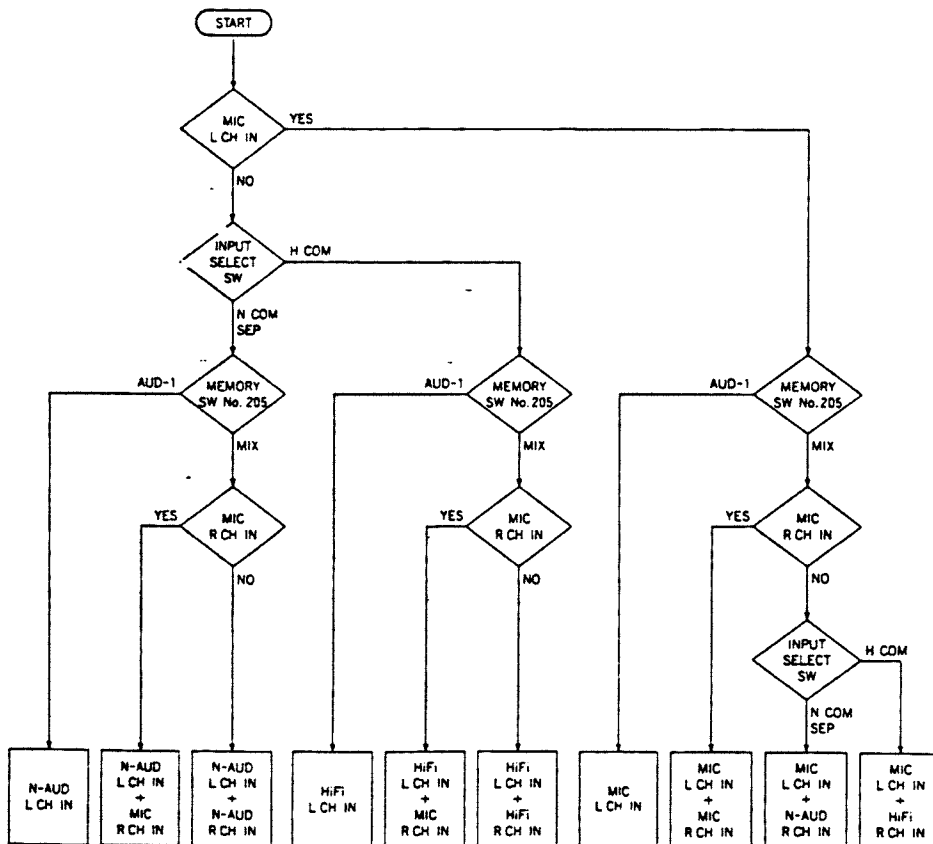


AUDIO RECORD SELECTION

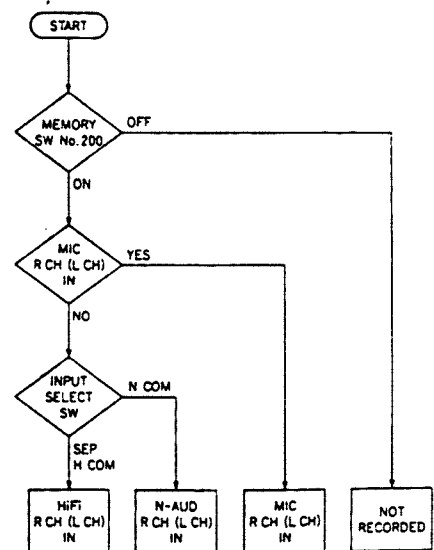
R CH REC



L CH REC

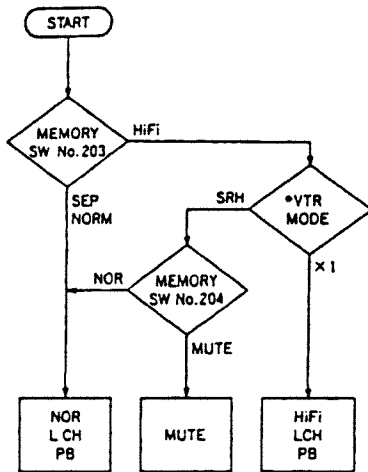


HiFi REC

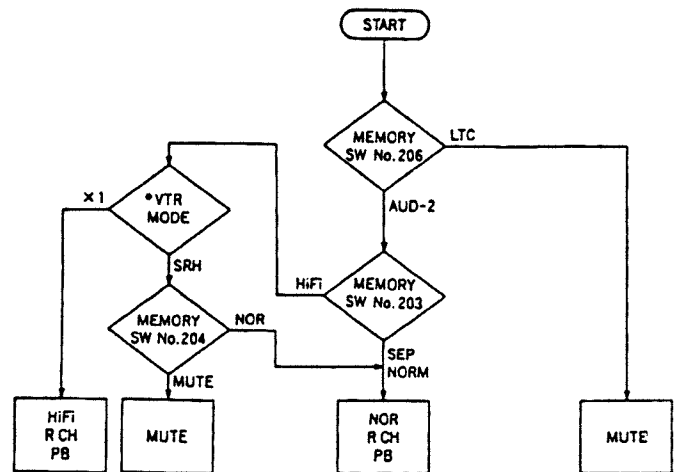


8.3 AUDIO OUTPUT SIGNALS

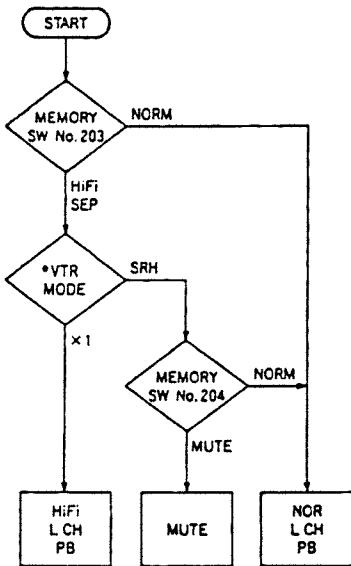
1. Normal audio output terminal (XLR) (L-ch)



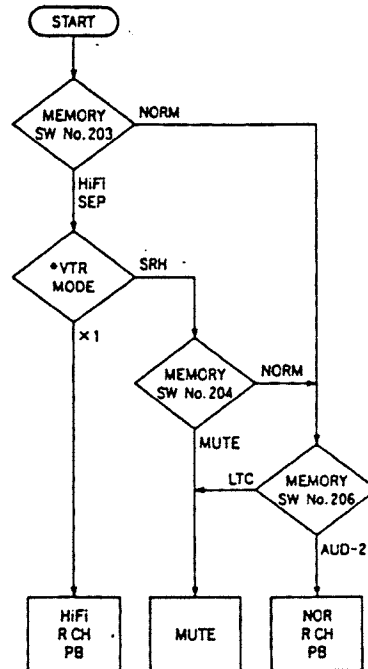
2. Normal audio output terminal (XLR) (R-ch)



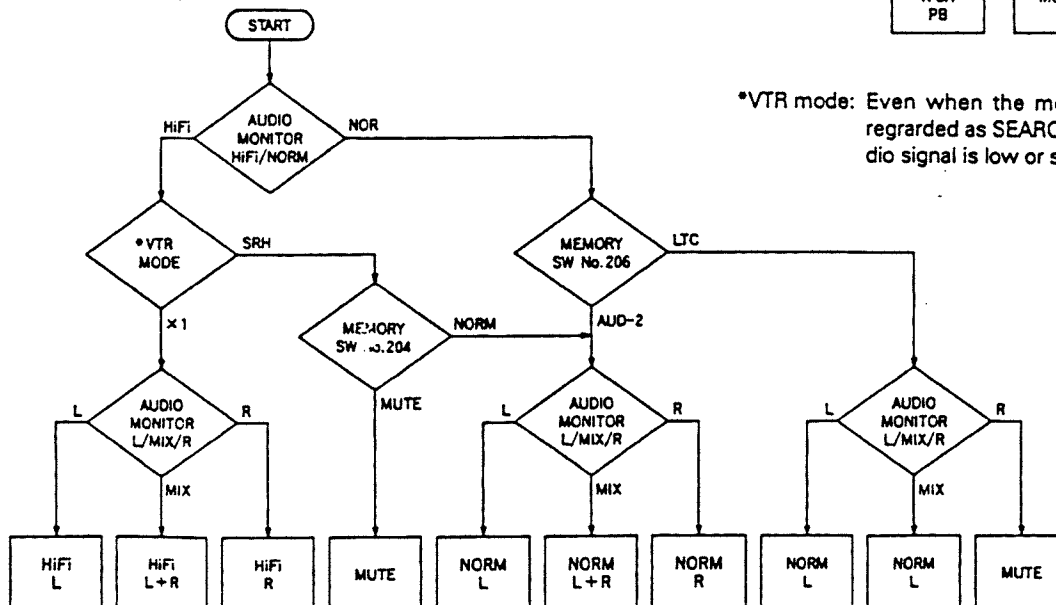
3. Hi-Fi audio output terminal (XLR) (L-ch)



4. Hi-Fi audio output terminal (XLR) (R-ch)

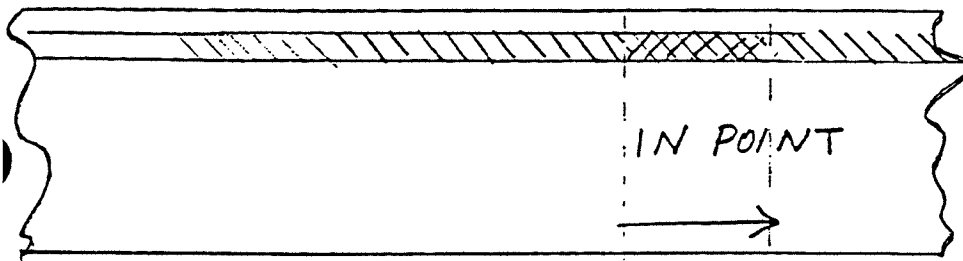
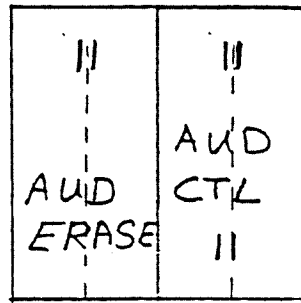


5. Monitor output terminal (RCA)

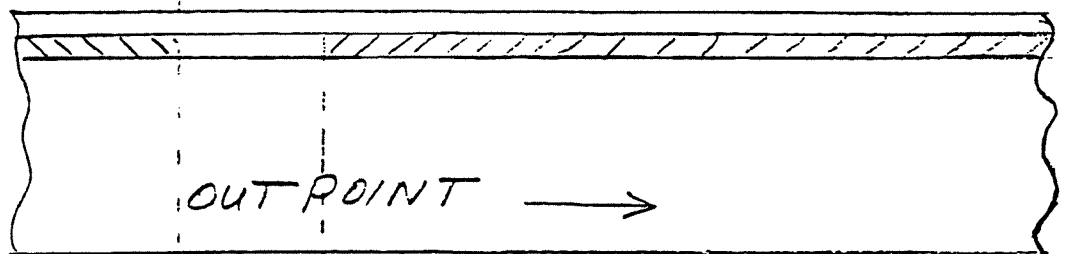


*VTR mode: Even when the mode is set to X1, this setting is regarded as SEARCH mode if PB FM level of Hi-Fi audio signal is low or servo lock is inactivated.

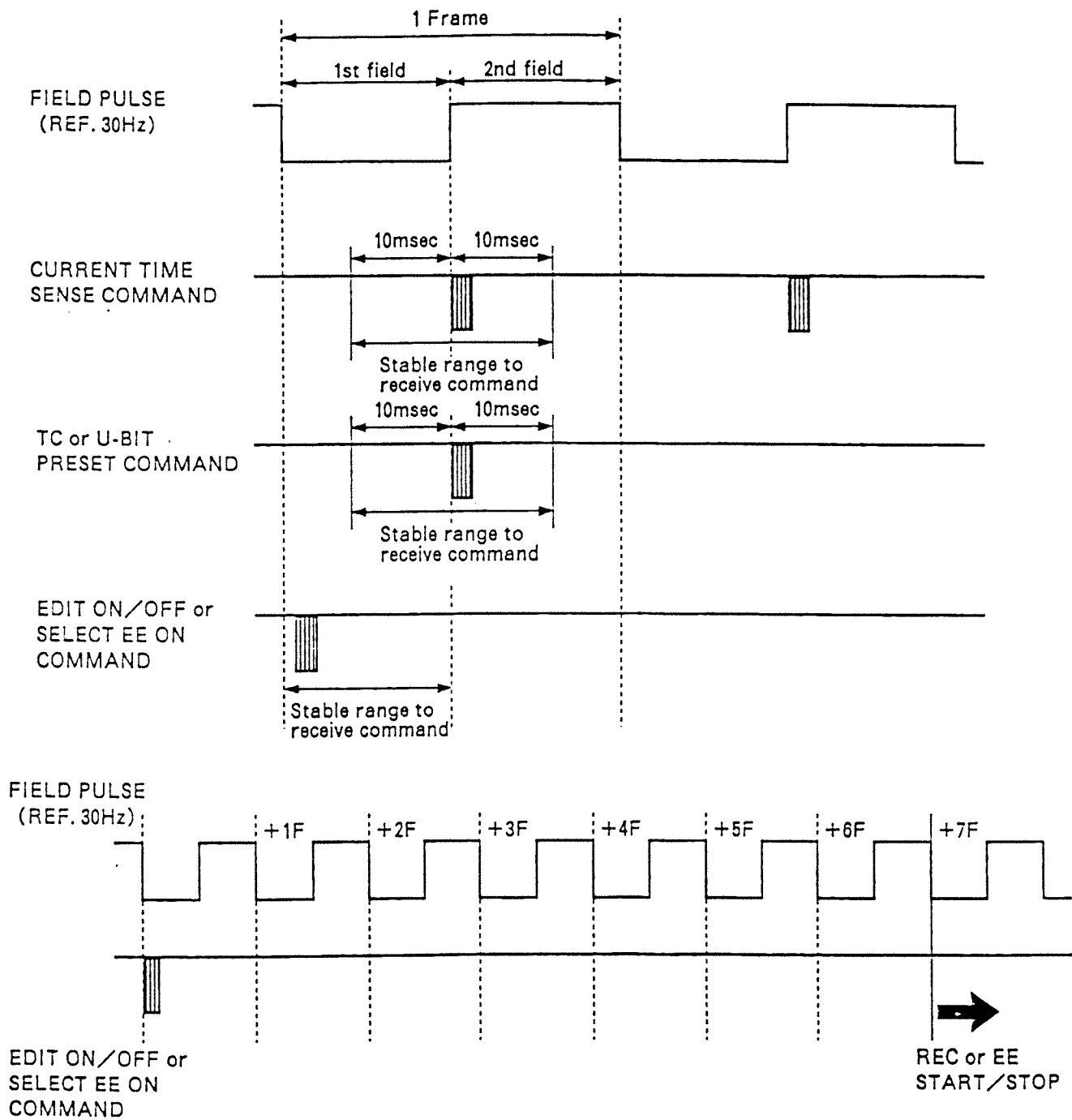
EDIT DELAY



← → ABOUT 6-7 FRAMES



.8.5 Detail timing chart



• EDIT DELAY switch

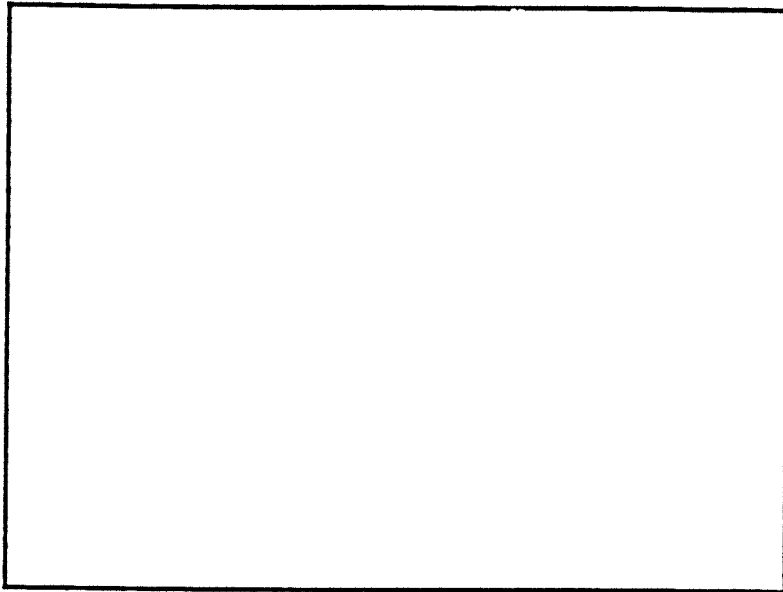
There is an interval of approximately equivalent to six frames between the normal audio erase head and R/P head. Therefore, if erase and recording operations are switched over at the same time, normal audio recording is doubled for 6 frames at its IN point while it has no recording for 6 frames at its OUT point. This problem will be solved if erase timing is advanced for 6 frames. In practice it needs to set the

controller's edit timing to "-7 FRAMES" with a controller capable for this processing as well as to set the edit delay time of video and normal audio to 7 frames. If the controller used in the set is incapable of setting edit timing to 7 frames, refer to Table 3-7-7 to set the switch to the MODE II for executing this processing.

CONTROLLER EDIT TIMING	No. 330 V. EDIT DL	No. 331 A. EDIT DL	IN OUT	REMARK
-7 FRAMES	7 FRAMES (MODE I)	7 FRAMES		Setting is best.
-3 FRAMES	3 FRAMES (MODE II)	3 FRAMES		Normal audio recording is doubled for 4 frames at IN point. OUT point is lagged to avoid sound drop-out.
-3 FRAMES	3 FRAMES (MODE III)	7 FRAMES		Normal audio recording is not doubled at IN point but IN and OUT points come off each other.
-3 FRAMES	7 FRAMES (MODE IV)	3 FRAMES		Do not use this mode since video edit point comes off.

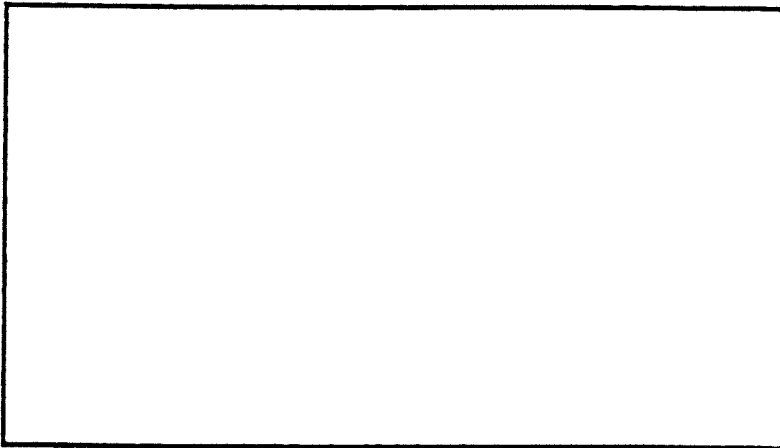
Wide Aspect Ratio available on JVC Products

4



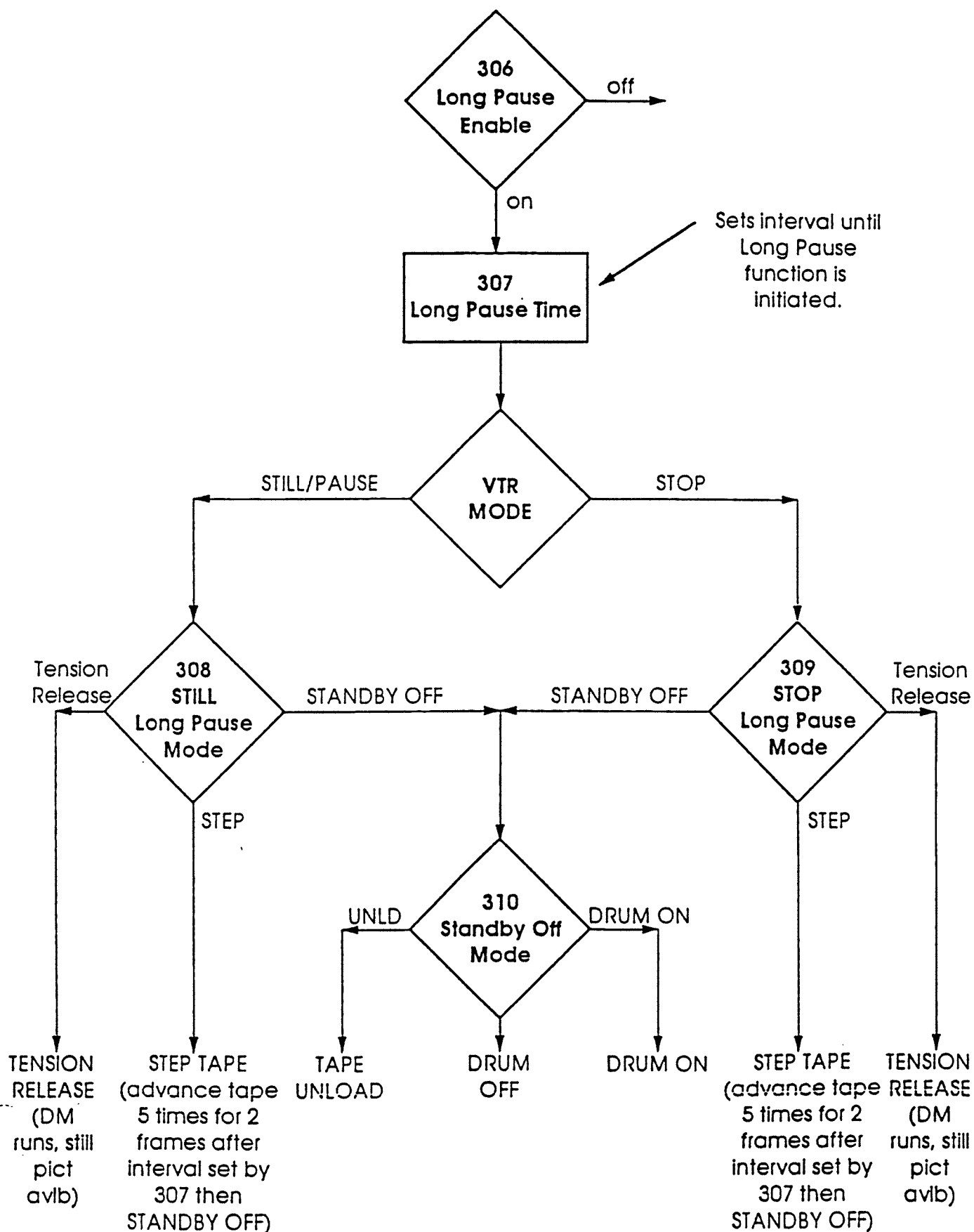
3

$(4) = 16$



$(2.25) = 9$

BR-S822/622U "Long Pause" in Still and Stop Modes

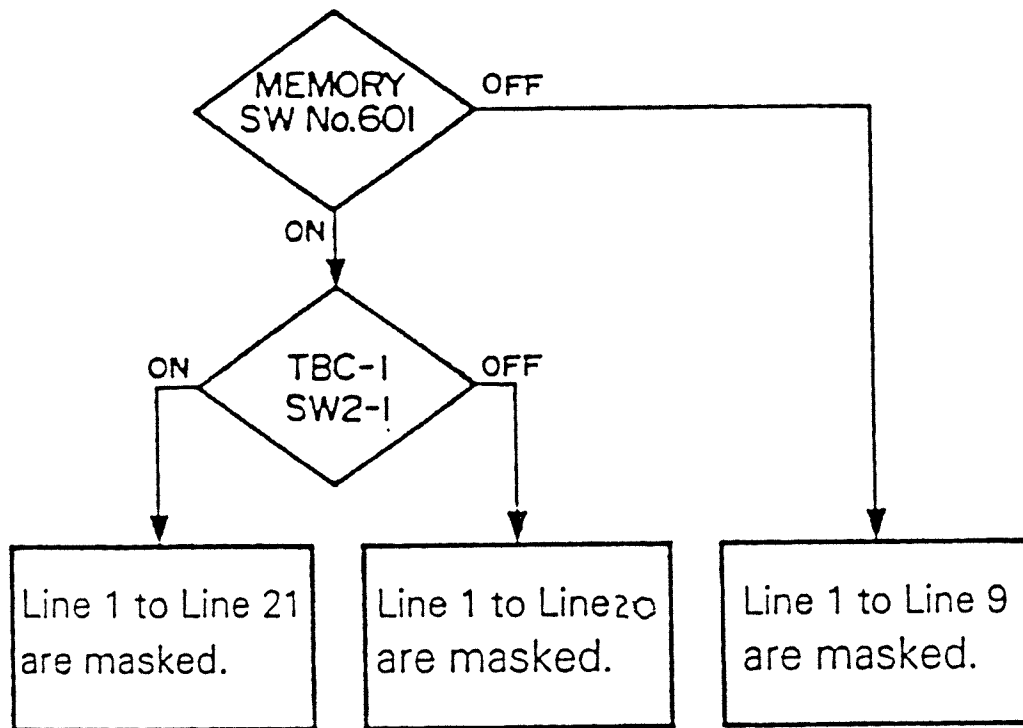


AUTOMATIC EDITING RETRIES.

MENU NO: 353 SYNC GRADE ACCURACY					
		±0 FRAME	±1 FRAME	±2 FRAME	ROUGH
MENU NO 354- SYNC GRADE AT RETRY.	NO CHANGE	3 TIMES ±0 ↓ EDIT MISS ↓ SKIP	3 TIMES ±1 ↓ EDIT MISS ↓ SKIP	3 TIMES ±2 ↓ EDIT MISS ↓ SKIP	ROUGH
	DOWN	2 TIMES ±0 ↓ EDIT MISS ↓ 1 TIME ±1 ↓ EDIT MISS ↓ SKIP	2 TIMES ±1 ↓ EDIT MISS ↓ 1 TIME ±2 ↓ EDIT MISS ↓ SKIP	2 TIMES ±2 ↓ EDIT MISS ↓ ROUGH	ROUGH

NO CHANGE : RETRY 3 TIMES WITH SAME ACCURACY SPECIFIED BY MENU # 353. IF EDIT CAN NOT BE PERFORMED THEN EDIT IS SKIPPED.

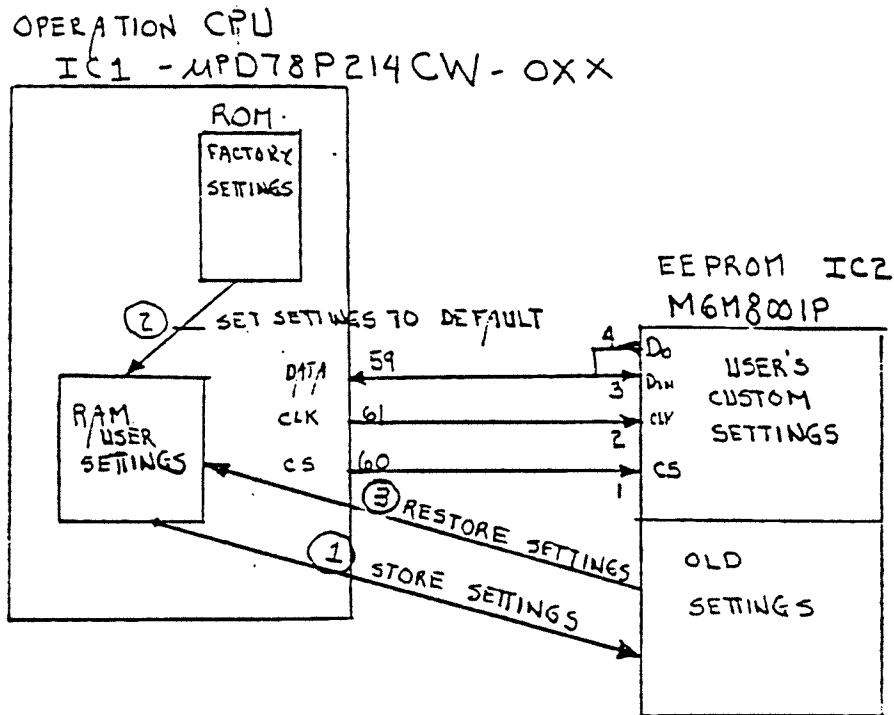
DOWN : RETRY 2 TIMES WITH ACCURACY SPECIFIED BY MENU # 353. IF EDIT CAN NOT BE PERFORMED THEN LOWER THE ACCURACY BY ONE STEP AND TRY. STILL CANNOT, THEN SKIPS



* Memory switch No. 601 is V. BLANK MASK switch.

Fig. 7-3-4 Masking in V. blanking period

Storing The User's Settings Prior To Servicing



Prior to executing the following operations eject any cassette and turn power off. After turning power off depress the indicated keys, turn power on while holding the keys depressed for an additional 5 seconds.

1. Store user's custom settings.

For 822 and 622 Depress the hold and eject button and turn power on.

For 522 Depress the pause/still and eject button and turn power on.

2. Reset Menu settings to factory defaults.

For 822 and 622 Depress the counter reset and eject button and turn power on.

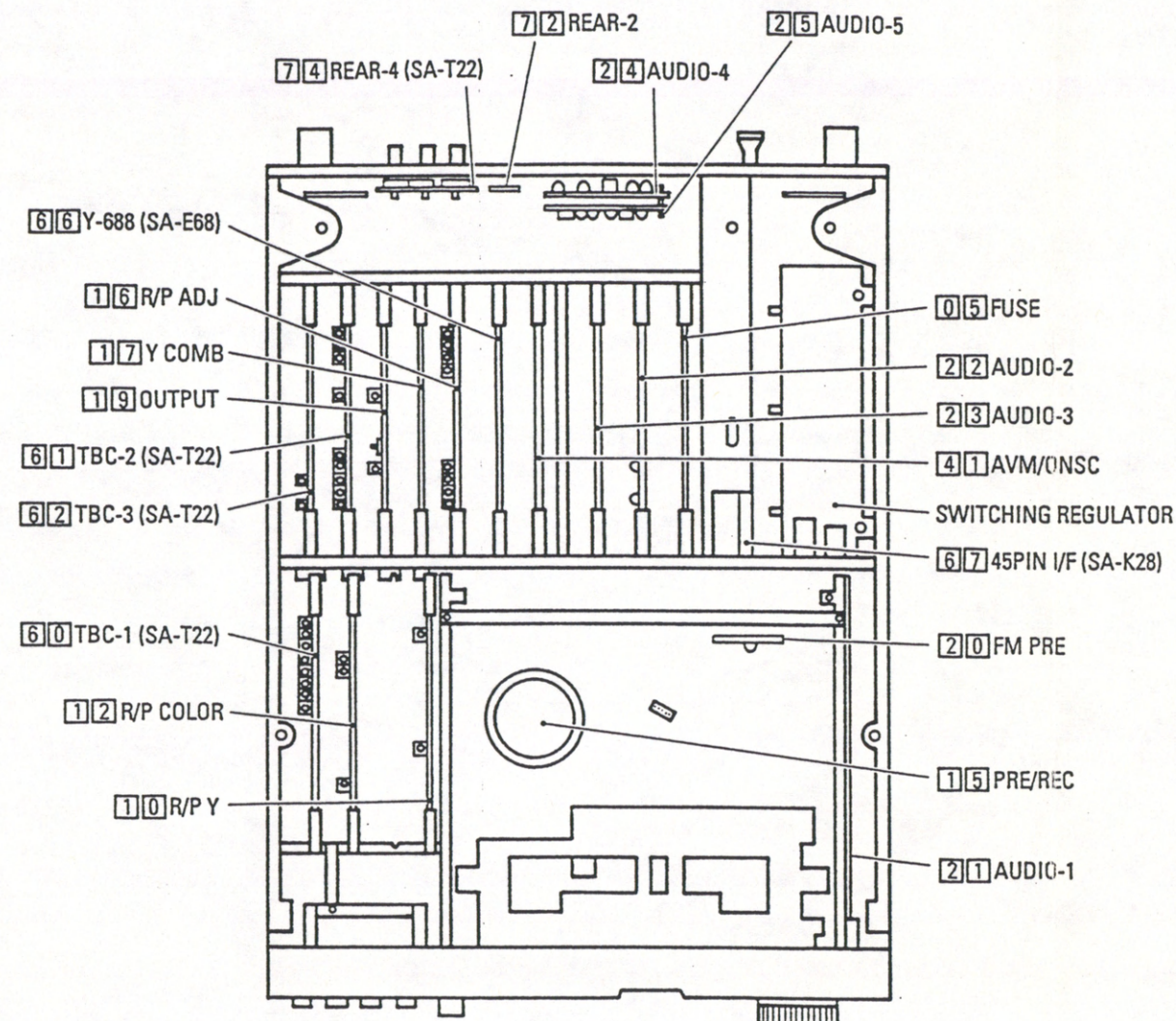
For 522 Depress the counter reset and eject button and turn power on.

3. Restore user's menu settings.

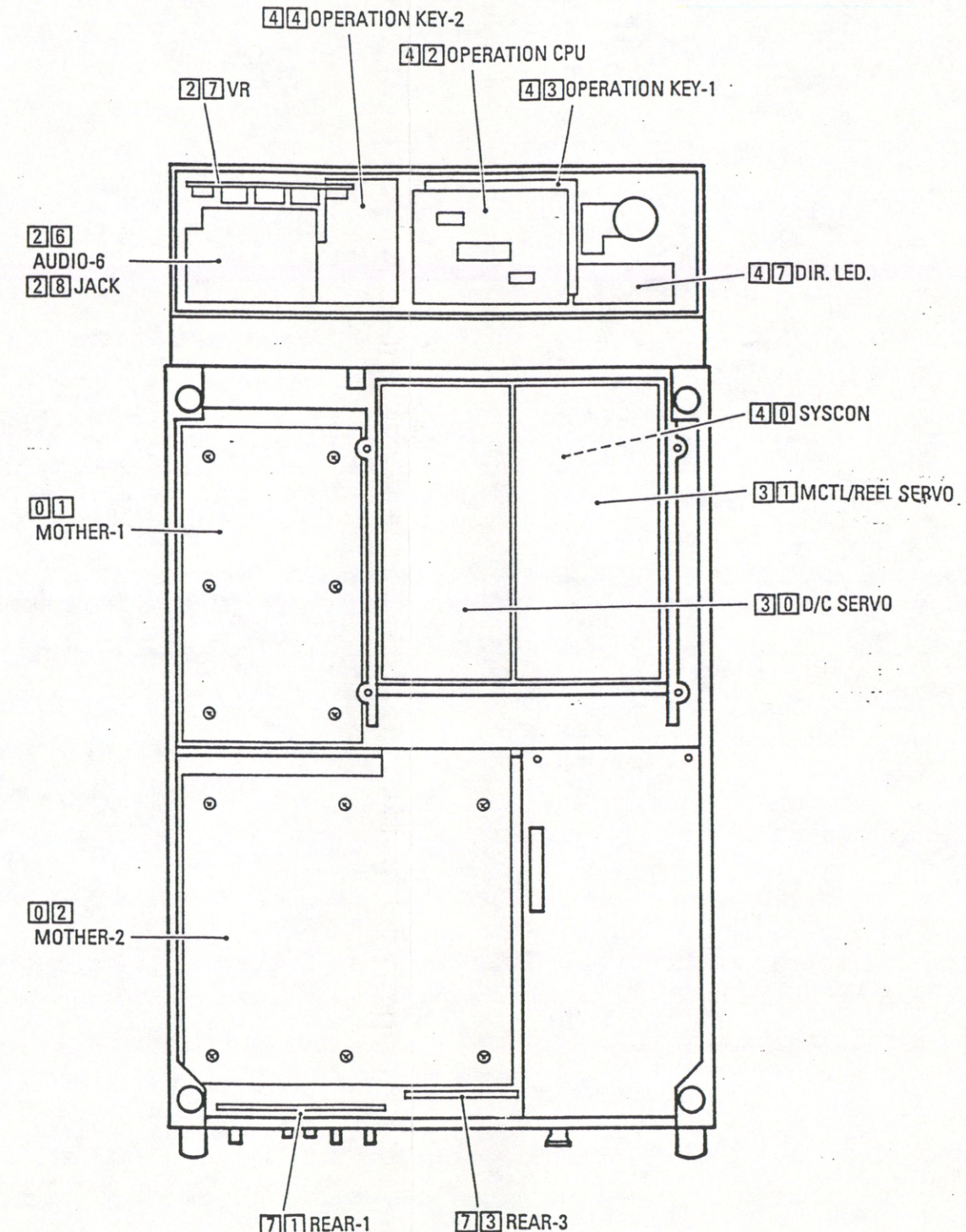
For 822 and 622 Depress the preset and eject button and turn power on.

For 522 Depress the play and eject button and turn power on.

Location of Boards

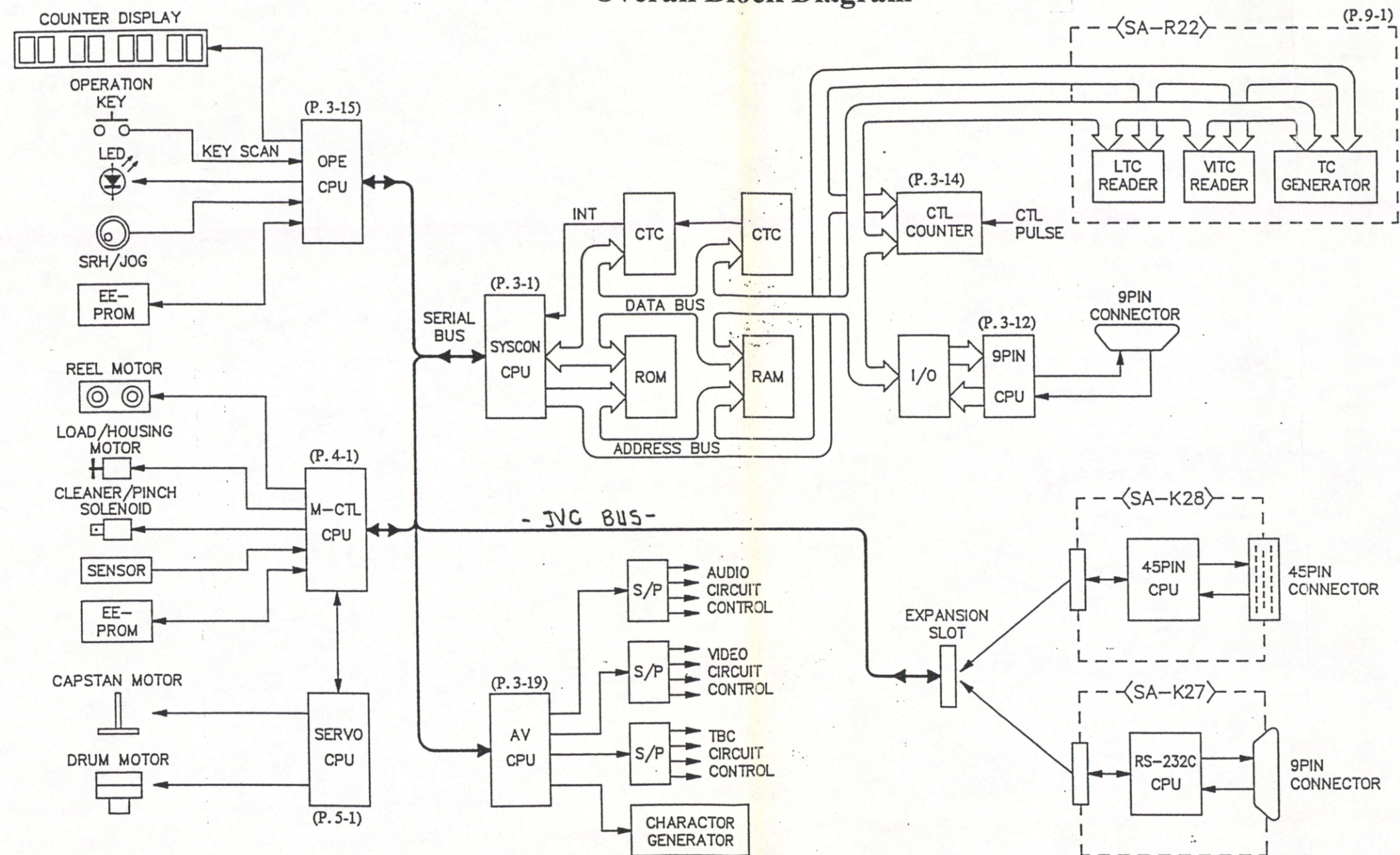


(Top view)



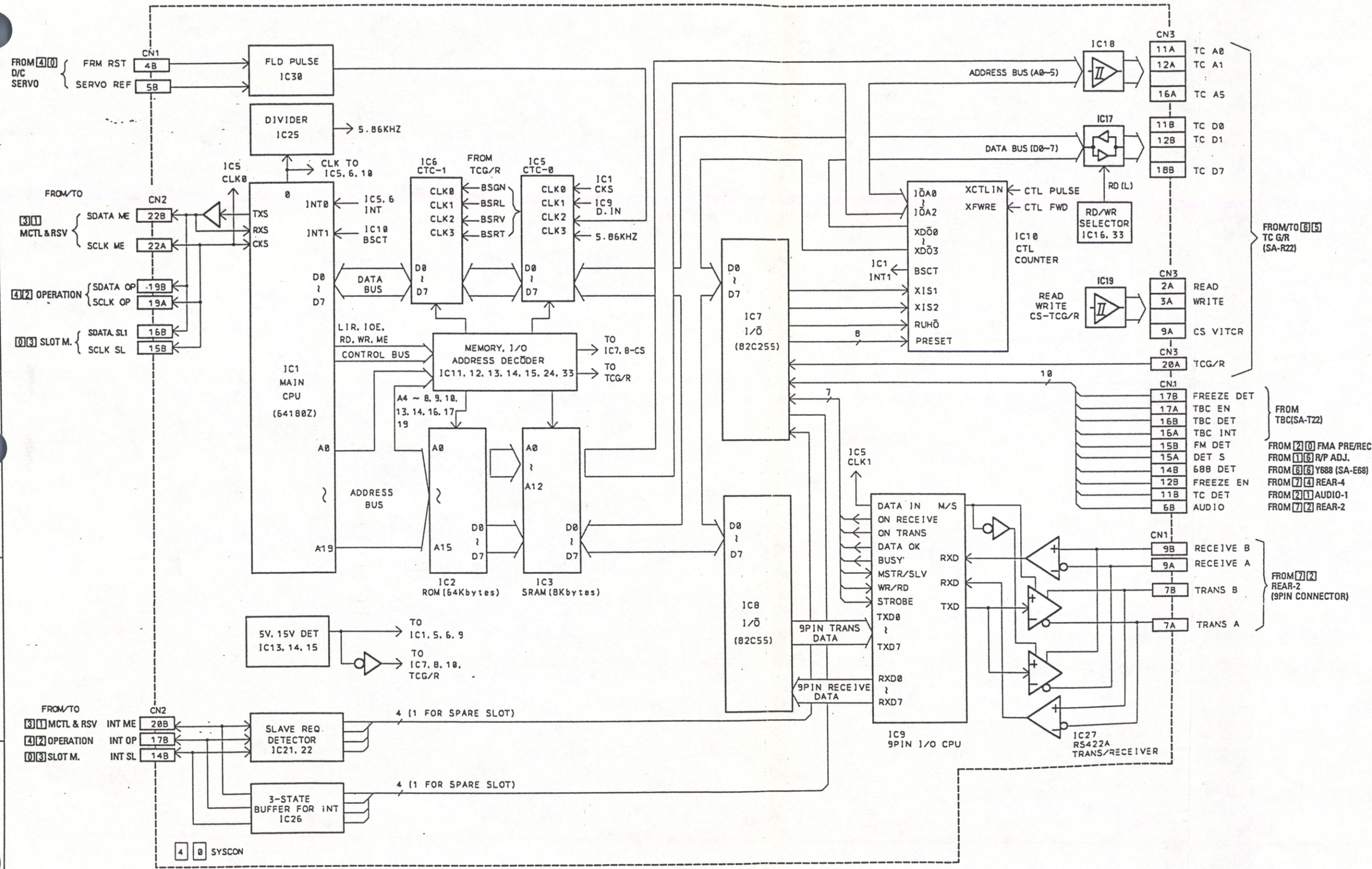
(Bottom view)

Overall Block Diagram



BOARD NAME	PART No.	PART NAME
SYSCON	IC2 : PGD30620-1-X	EP ROM
	IC9 : PGD30609-2-X	9-PIN CPU
M-CTL/RSV	IC1 : PGD30241-8-X	EP ROM
OPERATION CPU	IC1 : μ PD78P214CW-0XX	OPERATION CPU
AVM/OS	IC13 : μ PD75P116CW-3XX	AV CPU
D/C SERVO	IC20 : μ PD78134GF-053	SERVO CPU
45-PIN IF	IC1 : μ PD75P116CW-4XX	JVC 45-PIN CPU
RS-232C IF	IC16 : PGD30240-12-X	EP ROM

4.13 SYSCON BLOCK DIAGRAM



JVC's Internal Serial Bus

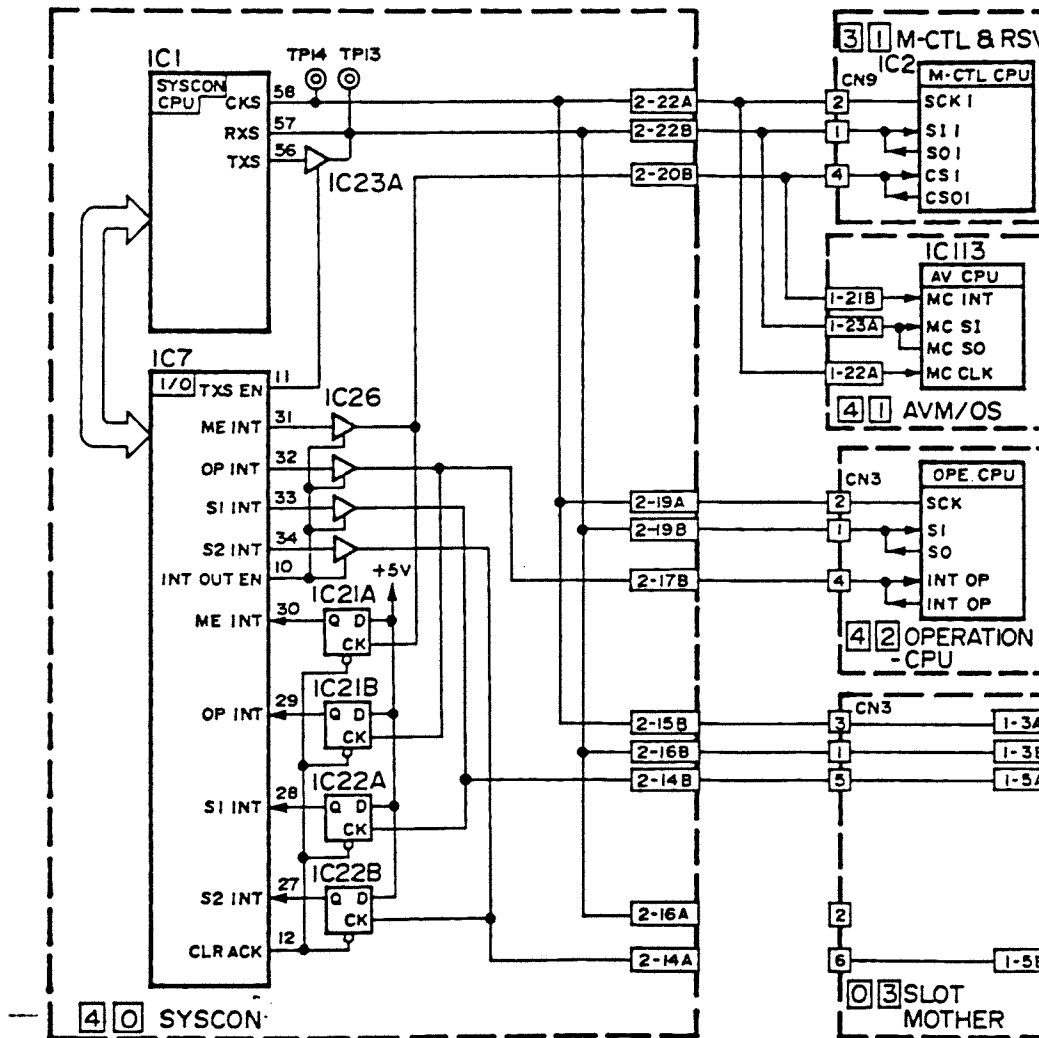


Fig. 3-3-1 Serial bus

Internal Serial Communications protocol

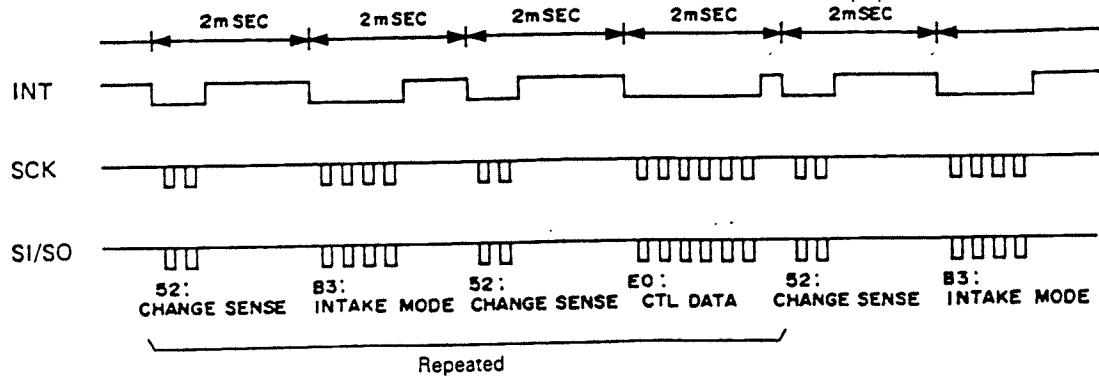


Fig. 3-3-4 Basic transfer mode

2. Data transfer from syscon CPU to slave CPU

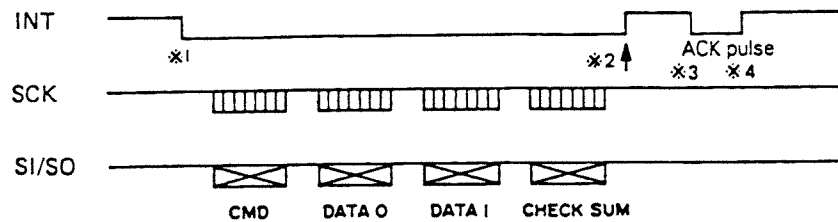


Fig. 3-3-5 Data transfer (from syscon CPU to slave CPU)

3. Data transfer from slave CPU to syscon CPU

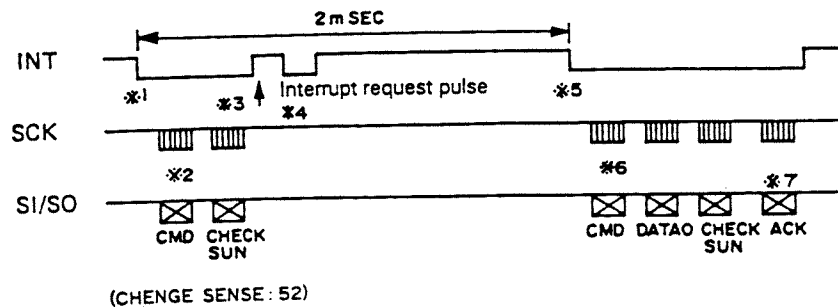
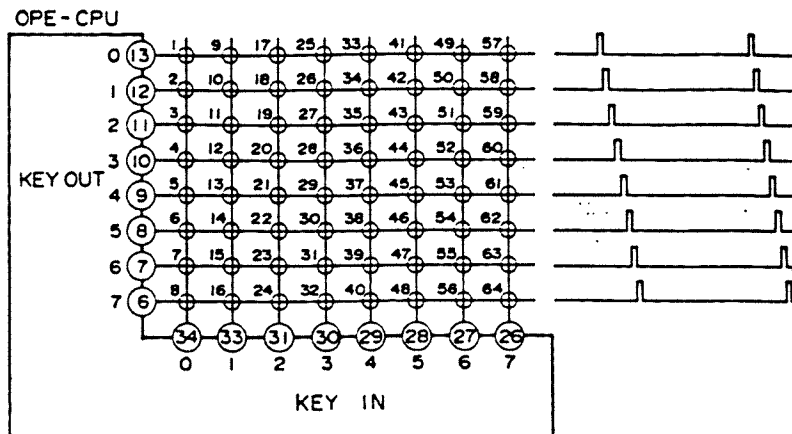


Fig. 3-3-6 Data transfer (from slave CPU to syscon CPU)

Operational CPU

3.6.5 Key scan

The operation CPU detects operational conditions of switches and buttons on the front panel with KEY SCAN pulse.



< BR-S822 >

1 : GO TO	17 : RESET	33 : ASSEM	49 : COUNTER "CTL"
2 : CANCEL	18 : JOG	34 : VID/HiFi	50 : COUNTER "UB"
3 : PREROLL	19 : —	35 : AUD-1	51 : REMOTE "REM-1"
4 : EDIT	20 : —	36 : AUD-2	52 : REMOTE "REM-2"
5 : REC	21 : —	37 : PREVIEW	53 : VID INPUT "YC358"
6 : PLAY	22 : —	38 : AUTO EDIT	54 : AUD MONI "HiFi"
7 : PAUSE/STILL	23 : —	39 : EDIT STOP	55 : AUD MONI "AUD-1"
8 : R	24 : —	40 : REVIEW	56 : AUD MONI "AUD-2"
9 : IN	25 : —	41 : HOLD	57 : F/C SW
10 : ENTRY	26 : —	42 : SHIFT	58 : TBC SW "ON"
11 : OUT	27 : —	43 : ADV	59 : SYNC SW "EXT"
12 : STANDBY	28 : —	44 : PRESET	60 : MENU SET "ON"
13 : REW	29 : —	45 : VID INPUT "BLACK"	61 : REC MODE "S-VHS"
14 : STOP	30 : —	46 : —	62 : —
15 : FF	31 : —	47 : —	63 : —
16 : P	32 : —	48 : EJECT	64 : (Note 1)

< BR-S622 >

1 : —	17 : RESET	33 : —	49 : COUNTER "CTL"
2 : —	18 : JOG	34 : —	50 : COUNTER "UB"
3 : —	19 : —	35 : —	51 : REMOTE "REM-1"
4 : AUD DUB	20 : —	36 : —	52 : REMOTE "REM-2"
5 : REC	21 : —	37 : —	53 : VID INPUT "YC358"
6 : PLAY	22 : —	38 : —	54 : AUD MONI "HiFi"
7 : PAUSE/STILL	23 : —	39 : —	55 : AUD MONI "AUD-1"
8 : —	24 : —	40 : —	56 : AUD MONI "AUD-2"
9 : —	25 : —	41 : HOLD	57 : F/C SW
10 : —	26 : —	42 : SHIFT	58 : TBC SW "ON"
11 : —	27 : —	43 : ADV	59 : SYNC SW "EXT"
12 : STANDBY	28 : —	44 : PRESET	60 : MENU SET "ON"
13 : REW	29 : —	45 : VID INPUT "BLACK"	61 : REC MODE "S-VHS"
14 : STOP	30 : —	46 : —	62 : —
15 : FF	31 : —	47 : —	63 : —
16 : —	32 : —	48 : EJECT	64 : (Note 1)

Note 1: In the BR-S822, KEY OUT 7 and KEY IN 7 are always connected by D3. Thus, the operation CPU discriminates between BR-S622 and BR-S822.

Fig. 3-6-2 Key scan

Operational CPU

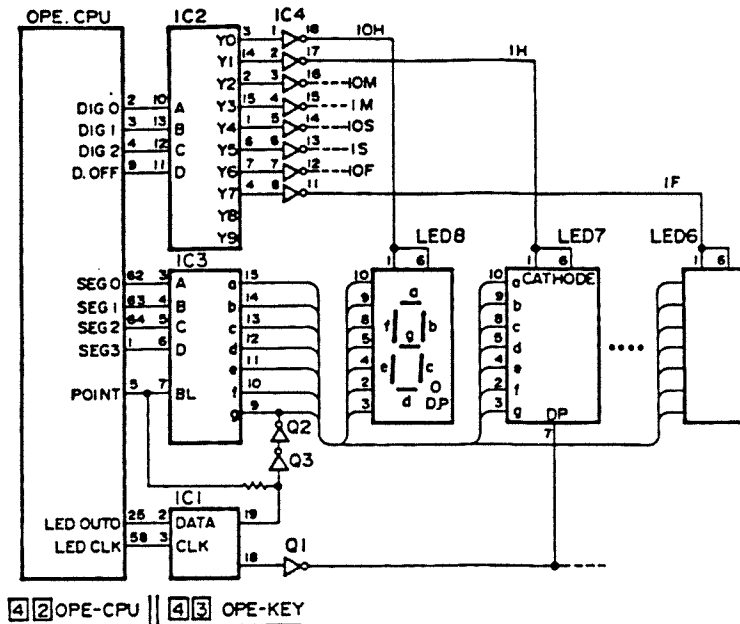


Fig. 3-6-1 Counter display circuit

INPUTS				OUTPUTS										SELECTED OUTPUT	SELECTED LED
D	C	B	A	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9		
L	L	L	L	H	L	L	L	L	L	L	L	L	L	Y0	LED 8
L	L	L	H	L	H	L	L	L	L	L	L	L	L	Y1	LED 7
L	L	H	L	L	L	H	L	L	L	L	L	L	L	Y2	LED 6
L	L	H	H	L	L	L	H	L	L	L	L	L	L	Y3	LED 5
L	H	L	L	L	L	L	L	H	L	L	L	L	L	Y4	LED 4
L	H	L	H	L	L	L	L	L	H	L	L	L	L	Y5	LED 3
L	H	H	L	L	L	L	L	L	L	H	L	L	L	Y6	LED 2
L	H	H	H	L	L	L	L	L	L	L	H	L	L	Y7	LED 1
H	L	L	L	L	L	L	L	L	L	L	L	H	L	Y8	NONE
H	L	L	H	L	L	L	L	L	L	L	L	L	H	Y9	NONE
H	X	H	X	L	L	L	L	L	L	L	L	L	L	NONE	NONE
H	H	X	X	L	L	L	L	L	L	L	L	L	L	NONE	NONE

Fig. 3-6-2 IC2 (TC74HC4028AP) truth value table

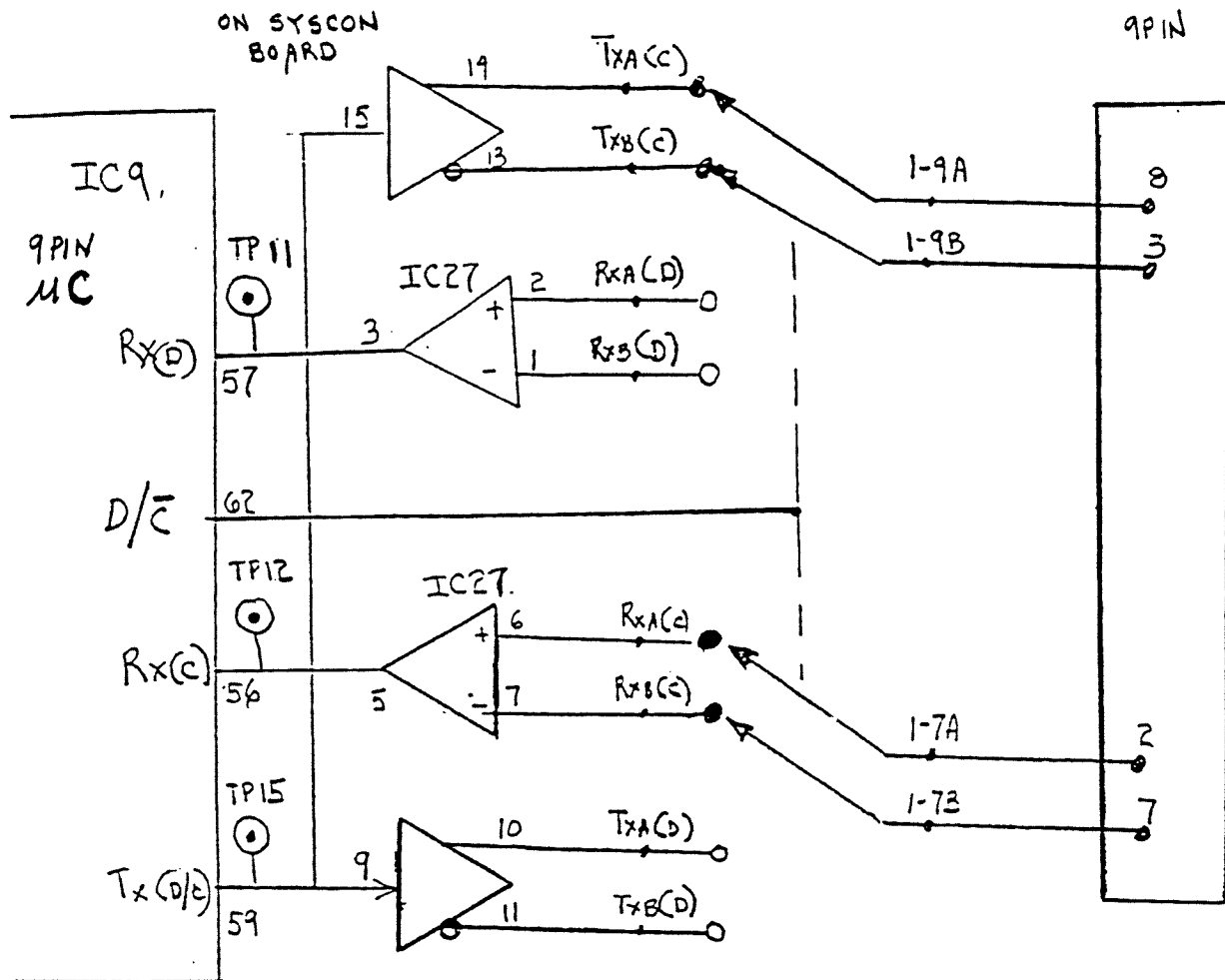
X : Don't care.

INPUTS						OUTPUTS								DISPLAY
ST	BL	D	C	B	A	a	b	c	d	e	f	g		
■	H	■	■	■	■	L	L	L	L	L	L	L	BLANK	
H	L	L	L	L	L	H	H	H	H	H	H	L	0	
H	L	L	L	L	H	L	H	H	L	L	L	L	1	
H	L	L	L	H	L	H	H	L	H	H	L	H	2	
H	L	L	L	H	H	H	H	H	H	L	L	H	3	
H	L	L	H	L	L	L	H	H	L	L	H	H	4	
H	L	L	H	L	H	H	L	H	H	L	H	H	5	
H	L	L	H	H	L	H	L	H	H	H	H	H	6	
H	L	L	H	H	H	H	H	H	L	L	H	L	7	
H	L	H	L	L	L	H	H	H	H	H	H	H	8	
H	L	H	L	L	H	H	H	H	H	L	H	H	9	
H	L	H	L	H	L	H	H	H	L	H	H	H	A	
H	L	H	L	H	H	L	L	H	H	H	H	H	b	
H	L	H	H	L	L	H	L	L	H	H	H	L	c	
H	L	H	H	L	L	L	H	H	H	H	L	H	d	
H	L	H	H	H	L	H	L	L	L	H	H	H	E	
H	L	H	H	H	H	H	L	L	L	H	H	H	F	
L	L	■	■	■	■	△△								

■ : Don't care.
 △△ : Depends upon the BCD code previously applied when ST = "H".
 △ : Required pull down resistor "RL".

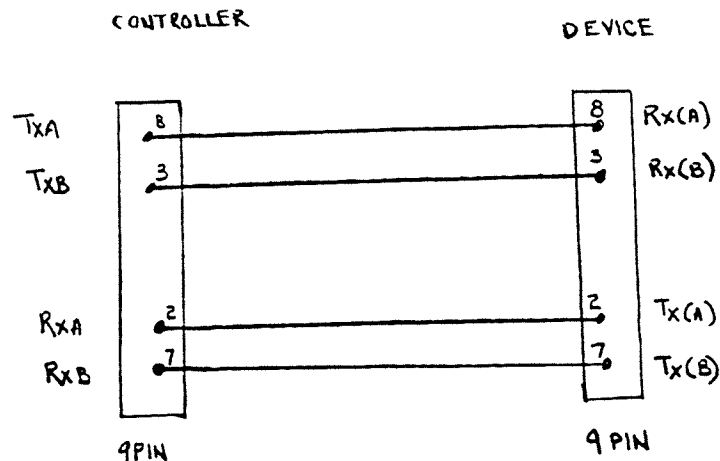
Fig. 3-6-3 IC3 (TC5068BP) truth value table

9 Pin SWAP Connector

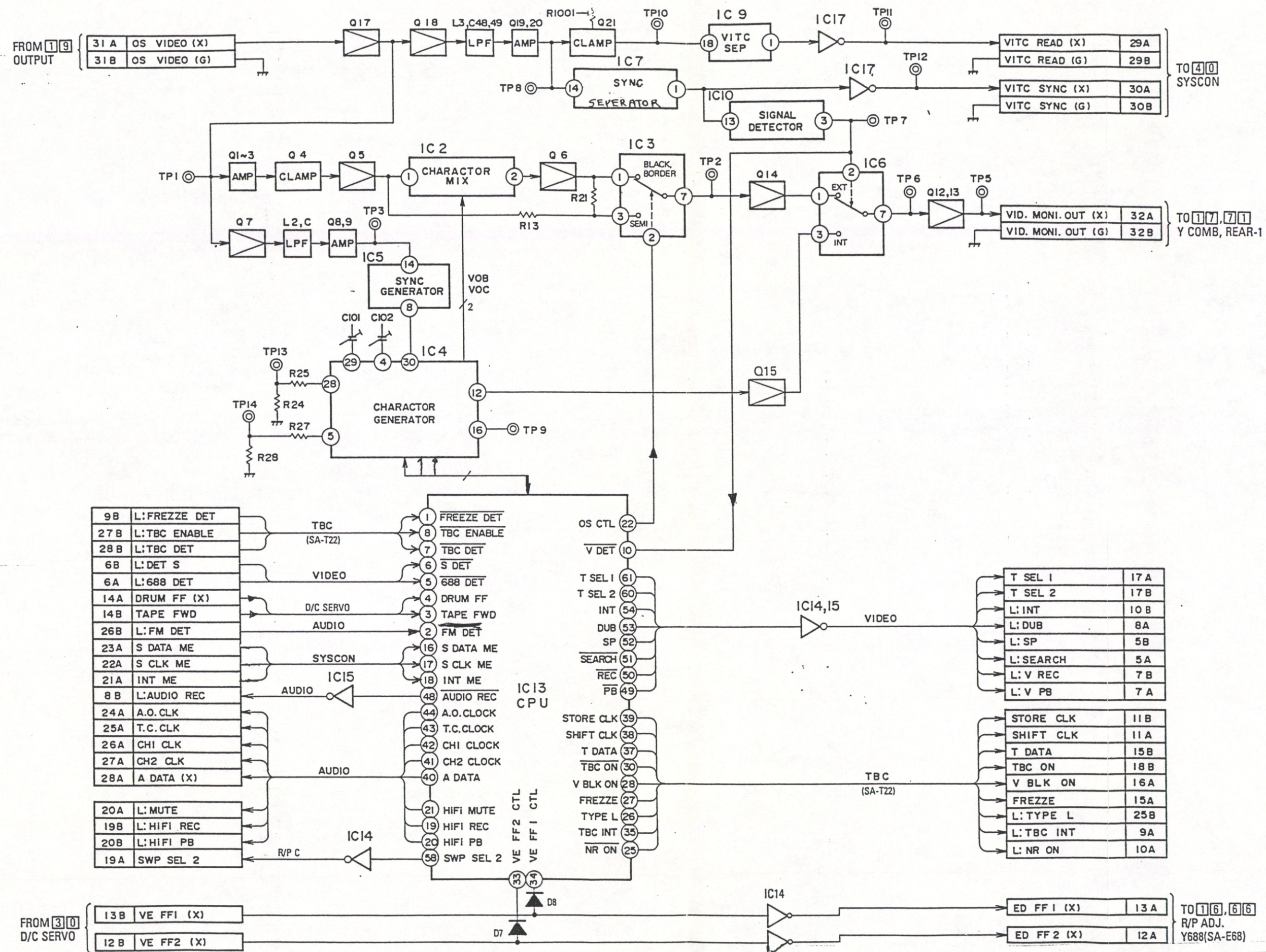


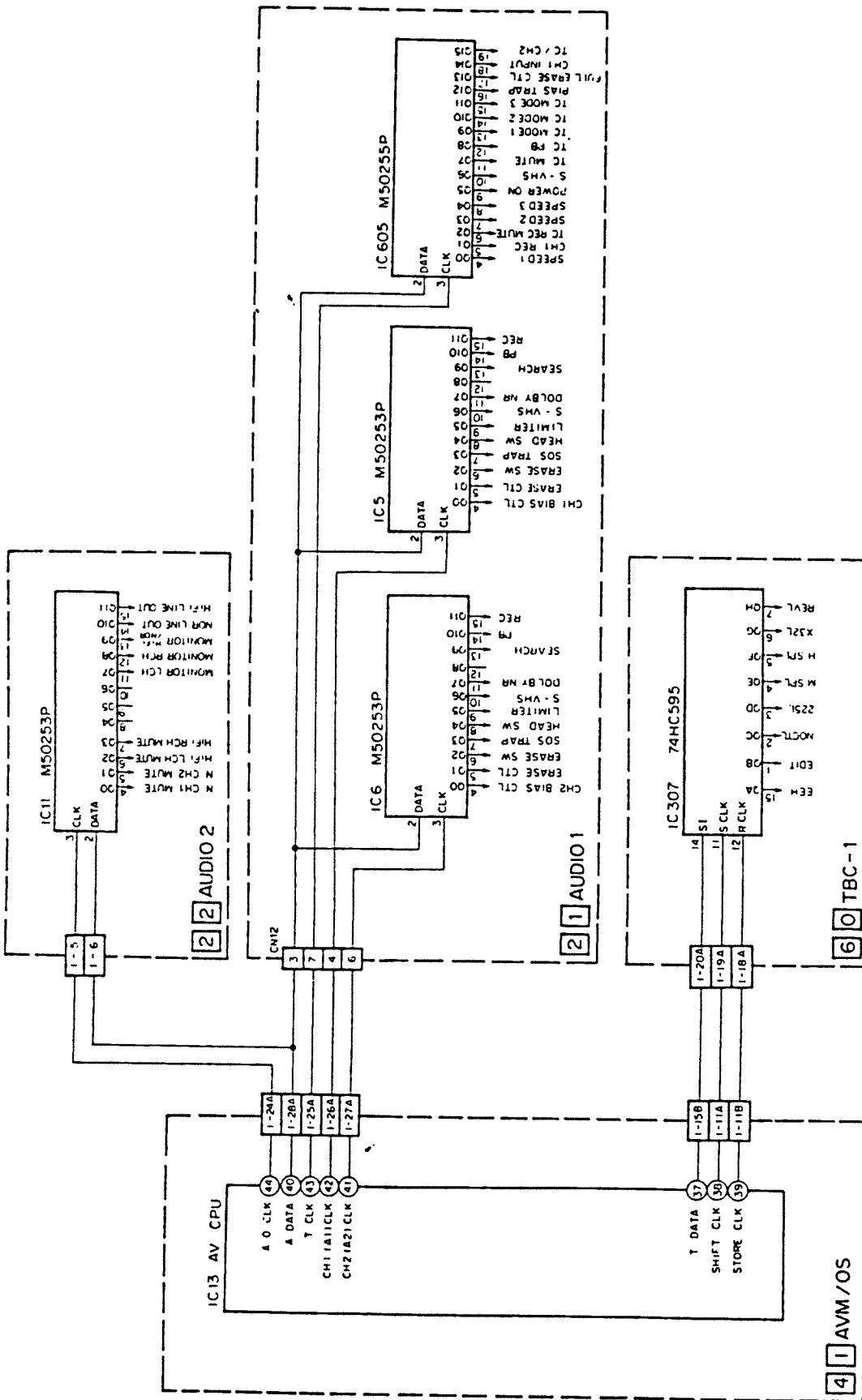
Located on Syscon Board

D= DEVICE.
C= CONTROLLER



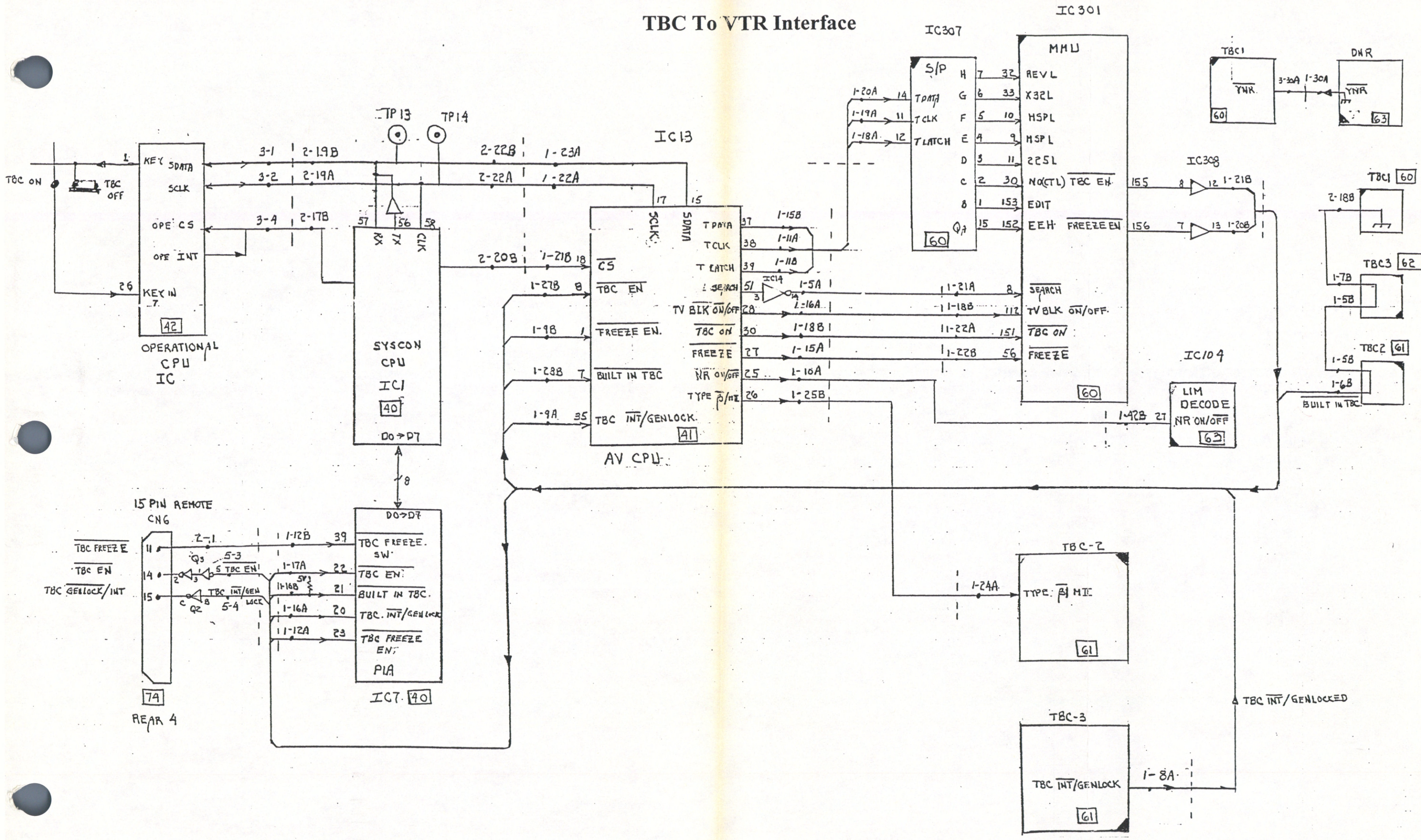
4.12 AV MICOM/ONSCREEN BLOCK DIAGRAM



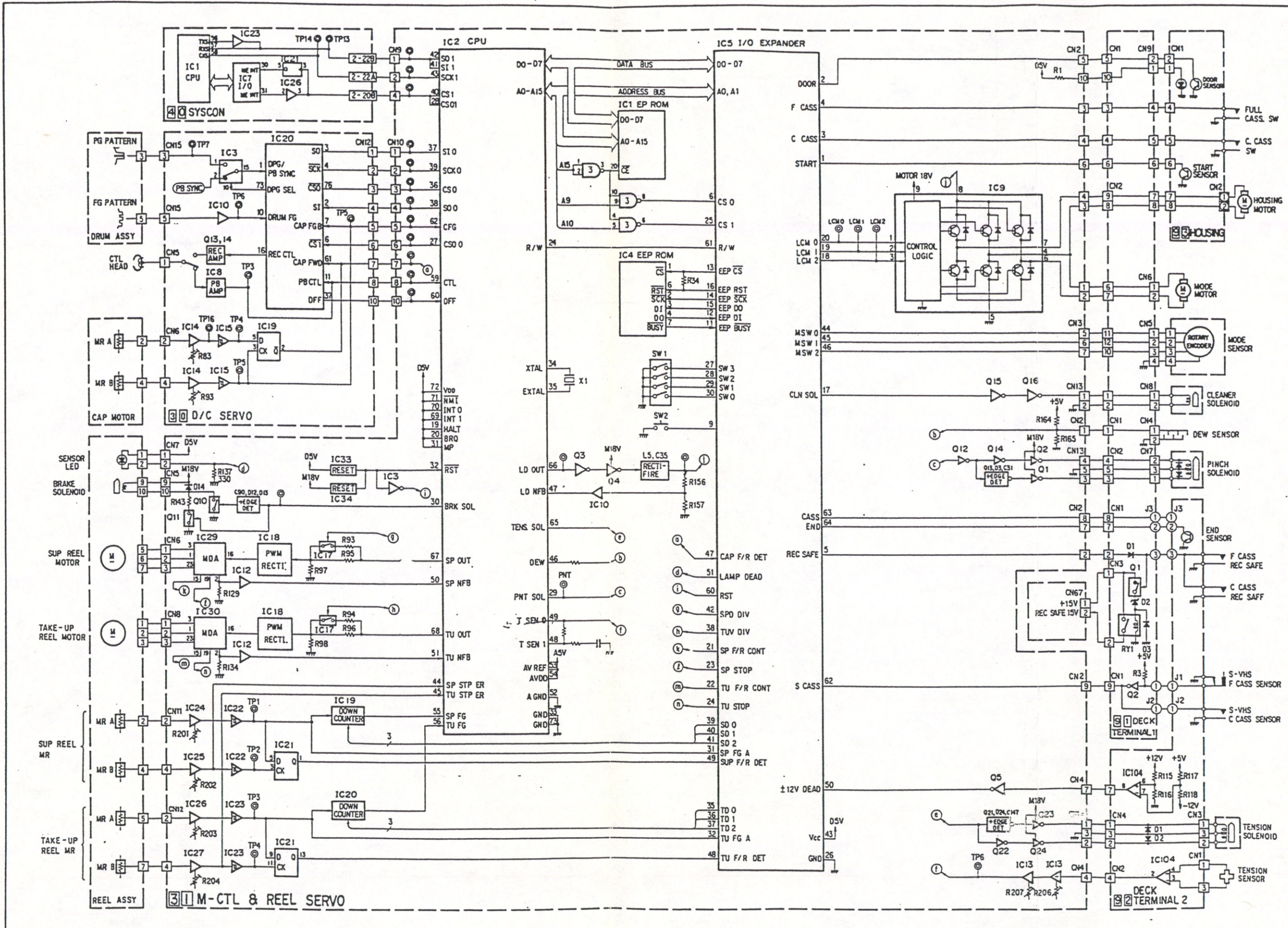


AVM/OS Serial Buses

TBC To VTR Interface



MCTL-Reel Servo-D/C Servo

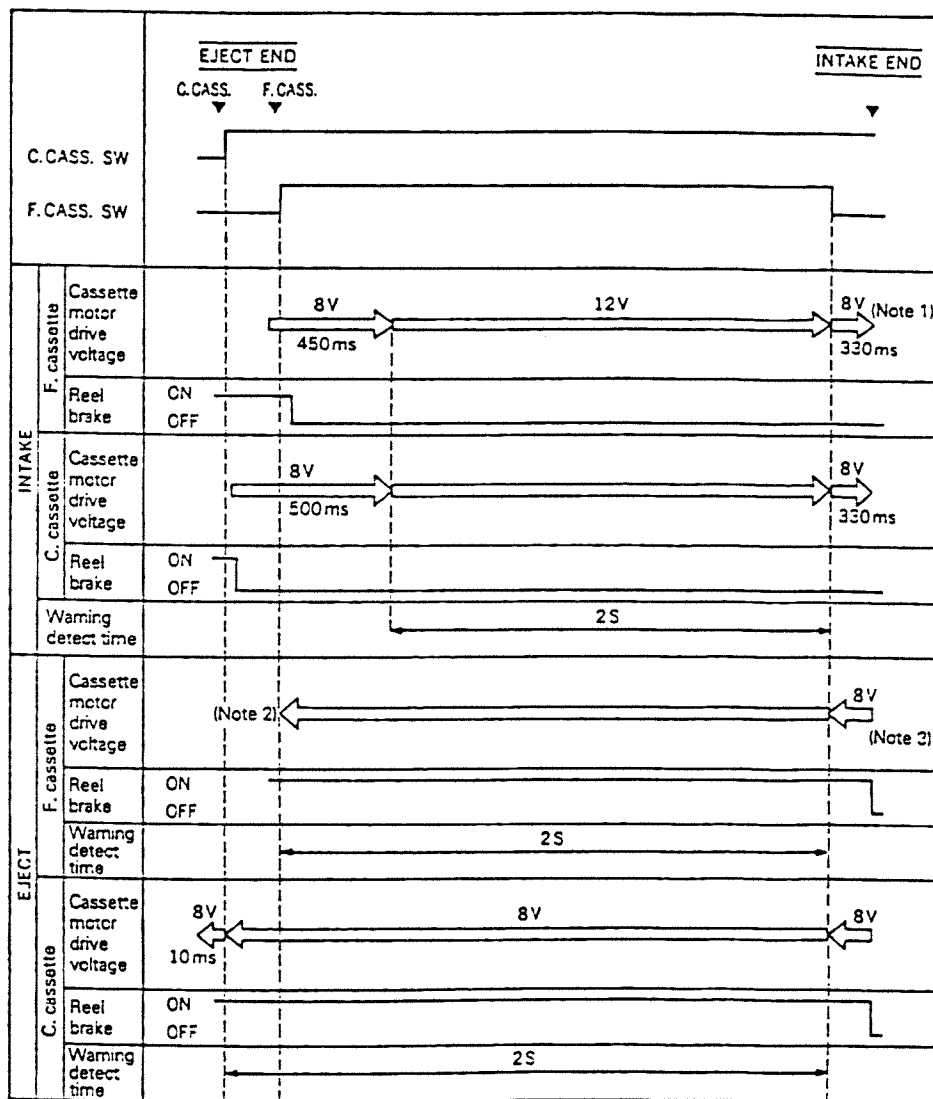


4.2.3 Control of mechanism modes

1. Cassette intake/eject operation

In VTRs of this series, eject end position differs depending on the size of a cassette loaded. Therefore, eject end is detected by the F. CASSETTE switch in the F. cassette mode and by the C. CASSETTE switch in the C. cassette mode respectively. Detection of intake end position is operated only by the F. CASSETTE switch since it is common to the both modes.

As a cassette is inserted into the cassette housing, the holder stay ass'y is pushed and the cassette switch is turned off. Accordingly, IC2, the M-CTL CPU, controls the motor drive circuit with 3-bit signal of LCM0-3 as shown in Table 4-2-3 to turn the cassette motor. At that time, torque of the motor is controlled by PWM output from pin(66) (LD OUT). The M-CTL CPU also functions to supply a certain voltage to IC9 by receiving voltage which PWM output is rectified from pin(47)



Cassette intake and eject timing diagram

Note 1) Only in the F. cassette mode, the supply reel motor is controlled to get the same torque as in loading for 1 second in order to take in the slack of the tape. The reel brake is turned on after that.

Note 2) The reel brake is turned off for 250 msec to rotate the take-up reel motor slightly. Thus the gear of the take-up reel disk gets engaged correctly with the gear ass'y for the C. cassette.

Note 3) In the condition that the power is turned on with a cassette inserted and in the unloading end, pressing the EJECT button takes in the slack of the tape as well as Note 1).

LCM0	LCM1	LCM2	OUT1	OUT2	OUT3	MODE	MOTOR
①	②	③	⑦	⑥	④		
H	L	L	L	O	H	FWD	CASSETTE
H	L	H	H	O	L	REV	
L	H	L	O	L	H	FWD	LOADING
L	H	H	O	H	L	REV	
H	H	※	L	L	L		BRAKE
L	L	※	O	O	O		STOP

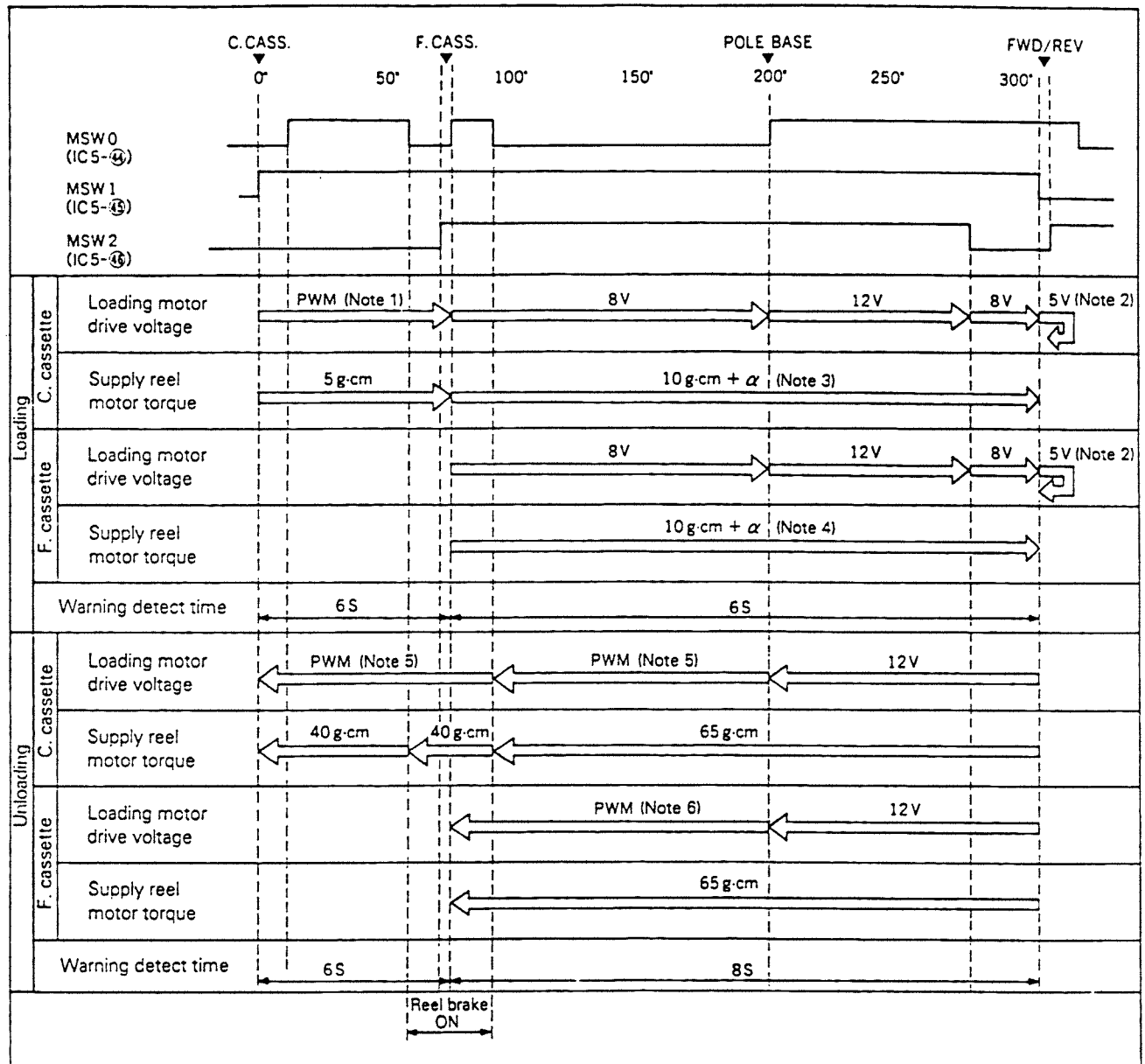
※ Don't care.

Table 4-2-3 IC9 (TA8405S) truth value

2. Loading/Unloading

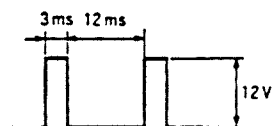
Loading and unloading are operated by the loading motor. In this operation, the M-CTL CPU detects the mechanism

position with three output signals of the mode sensor and controls the mechanism for loading/unloading as shown in Fig. 4-2-2.

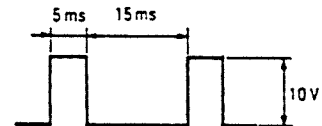


Tape loading/Unloading timing diagram

Note 1) PWM pulse waveform



Note 5) PWM pulse waveform

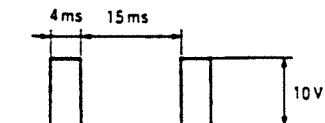


Note 2) Reverse braking is applied for 40 msec.

Note 3) Torque of + α increases near loading end depending on the position of the tension arm. α varies between 0 and 20 g·cm.

Note 4) Torque of + α increases near loading end depending on the position of the tension arm. α varies between 0 or 10 and 30 g·cm.

Note 6) PWM pulse waveform



Tension and Reel Servo Adjustment Switch

3.1 M. CTL & R. SERVO

Symbol No.	Switch Name	Setting at Shipment	Function																																																																																					
SW1	Adjusting switch	SW1 <div><div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div></div><div>1234</div></div> ON	<p>Normally set SW1 to OFF.</p> <p>When power is turned on after SW1 was set, mode changes as shown in the following table.</p> <p><i>Note: If power is turned on with SW1 set on all, adjustment data of R. SERVO circuit will be initialized. On such an occasion, readjust R. SERVO circuit again (see 2.5).</i></p> <table><tr><th>1</th><th>2</th><th>3</th><th>4</th><th>Mode</th></tr><tr><td></td><td></td><td></td><td></td><td>Normal operation</td></tr><tr><td>ON</td><td></td><td></td><td></td><td>Load end stop mode, Reel FG duty adjustment mode</td></tr><tr><td></td><td>ON</td><td></td><td></td><td>F. cassette loading torque check mode</td></tr><tr><td>ON</td><td>ON</td><td></td><td></td><td>Play back tension adjustment mode, Warning tension setting mode</td></tr><tr><td></td><td></td><td>ON</td><td></td><td>C. cassette loading torque data setting mode (Up)</td></tr><tr><td>ON</td><td></td><td>ON</td><td></td><td>C. cassette loading torque data setting mode (Down)</td></tr><tr><td></td><td>ON</td><td>ON</td><td></td><td>Inhibit</td></tr><tr><td>ON</td><td>ON</td><td>ON</td><td></td><td>Inhibit</td></tr><tr><td></td><td></td><td></td><td>ON</td><td>Emergency roll mode</td></tr><tr><td>ON</td><td></td><td></td><td>ON</td><td>Inhibit</td></tr><tr><td></td><td>ON</td><td></td><td>ON</td><td>Inhibit</td></tr><tr><td>ON</td><td>ON</td><td></td><td>ON</td><td>Inhibit</td></tr><tr><td></td><td></td><td>ON</td><td>ON</td><td>Reverse torque data setting mode (Up)</td></tr><tr><td>ON</td><td></td><td>ON</td><td>ON</td><td>Reverse torque data setting mode (Down)</td></tr><tr><td></td><td>ON</td><td>ON</td><td>ON</td><td>Starting torque check mode</td></tr><tr><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>Single unit adjustment mode (To initialize adjustment data)</td></tr></table>	1	2	3	4	Mode					Normal operation	ON				Load end stop mode, Reel FG duty adjustment mode		ON			F. cassette loading torque check mode	ON	ON			Play back tension adjustment mode, Warning tension setting mode			ON		C. cassette loading torque data setting mode (Up)	ON		ON		C. cassette loading torque data setting mode (Down)		ON	ON		Inhibit	ON	ON	ON		Inhibit				ON	Emergency roll mode	ON			ON	Inhibit		ON		ON	Inhibit	ON	ON		ON	Inhibit			ON	ON	Reverse torque data setting mode (Up)	ON		ON	ON	Reverse torque data setting mode (Down)		ON	ON	ON	Starting torque check mode	ON	ON	ON	ON	Single unit adjustment mode (To initialize adjustment data)
1	2	3	4	Mode																																																																																				
				Normal operation																																																																																				
ON				Load end stop mode, Reel FG duty adjustment mode																																																																																				
	ON			F. cassette loading torque check mode																																																																																				
ON	ON			Play back tension adjustment mode, Warning tension setting mode																																																																																				
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ON		ON	ON	Reverse torque data setting mode (Down)																																																																																				
	ON	ON	ON	Starting torque check mode																																																																																				
ON	ON	ON	ON	Single unit adjustment mode (To initialize adjustment data)																																																																																				
SW2	Tact switch for adjustment	—	<p>To be used in adjustment mode.</p> <p>To raise/decline torque and to set data in adjustment modes set by SW1. Also used to roll up tape in emergency roll mode.</p>																																																																																					

Software Initiated Adjustment and Troubleshooting Modes

1.5 ADJUSTMENT MODE

To set to the Adjustment Mode, depress the COUNTER RESET button, the FF button and the REW button while pressing the POWER switch to ON. The counter displays "..... 0 0" and the set enters the "Adjustment Mode 0".

To select an adjustment mode, turn the JOG dial to change the mode. Turning off the power cancels the adjustment mode. Kinds of the adjustment modes with details are shown in the following table.

Adjustment Mode	Counter Display	Description	Adjustment Item
1	..... 0 1	Normal Audio CH-1 is set to REC mode.	Not used in the adjustment procedures.
2	..... 0 2	Normal Audio CH-2 is set to REC mode.	
3	..... 0 3	Both channels of Normal Audio are set to REC mode.	
4	..... 0 4	Tracking VR function is cancelled.	
5	..... 0 5	Drum and capstan rotate.	Used for section 2.2.2 and 2.3.3.
6	..... 0 6	Enters to RAP mode.	Used for section 3.4
7	..... 0 7	CTL signal is recorded.	Used for section 2.5.4 and 2.5.6. (BR-S522J only)
8	..... 0 8	Not used	
5	5		
2 4	..... 2 4		

CTL Insert feature of 22' series.

Insert edit can not be performed on a tape if one or more CTL pulse(s) is missing on the tape. It was impossible to salvage the tape and save a few hours of work if this ever happened on a tape.

JVC's '22 series machines, after system control version 1-10, are capable of re-inserting control pulses. Follow the steps listed below to perform this function.

1. Locate the point where the CTL is missing by monitoring the counter display or CTL pulse indicator.
2. Playback the tape in reverse direction and stop the tape a few seconds before the point where the CTL pulse is missing.
3. Power off the unit.
4. Press and continue to hold the three buttons- 'counter reset,' 'Rew,' and 'FF' while turning the power on- until the display shows -00-.
5. Turn the Jog dial of the unit till the display increments to -07-.
6. Playback the tape till it passes the point where the CTL pulse was missing. (CTL is being inserted now.)
7. Eject the tape and power off the unit.

This feature is possible by BR-S622U and BR-S822U (after syscon version 1-10), and also by BR-S525U /BR-S522U. See page 1-11 of the service manual 9246C for details about the adjust mode.

Mechacon's EEPROM

1. Outline of function

IC4 is a CMOS EEPROM (Electrically Erasable and Programmable ROM) of 1024 bits (16 bits × 64 words). This IC that is a clock synchronous serial input/output type reads data in the leading edge of the clock while outputs data synchronously with the fall of the clock. Each data is divided into a unit of 8

bits. First 8 bits are used as mode data, second 8 bits as address data, and the rest of 16 bits as input and output data. The mode is divided into five kinds of write, read, write enable, write inhibit and status output, and one of them can be designated.

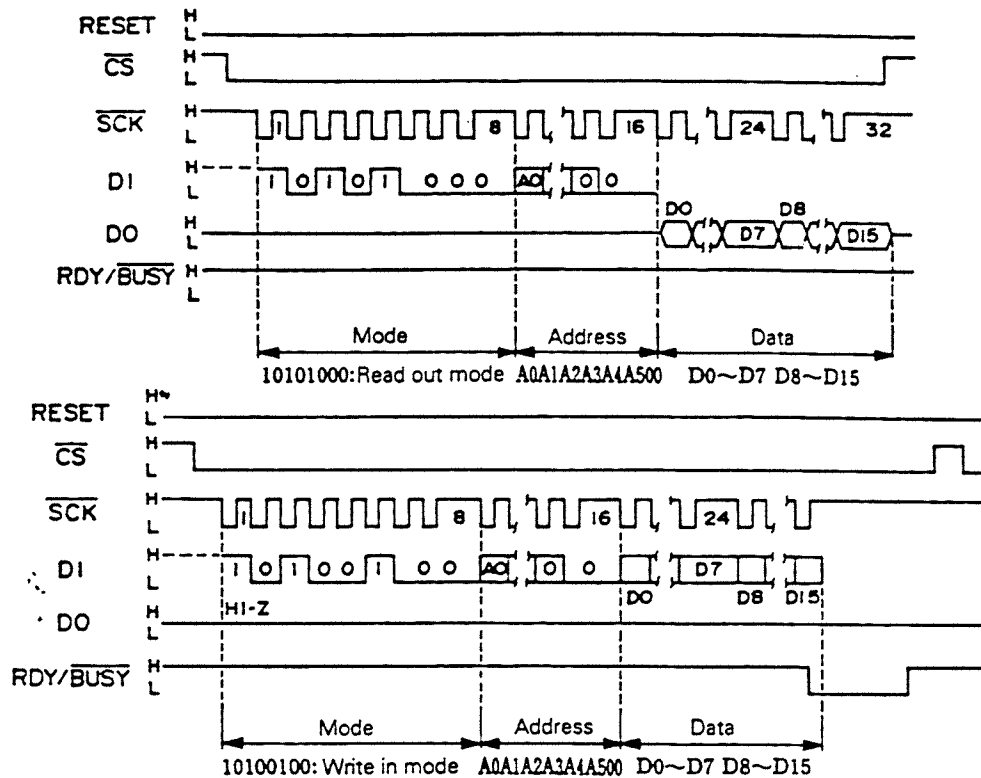


Fig. 4-2-9 Timing charts of read and write modes

2. Write data

The M-CTL CPU writes the following data in the EEPROM.

- ① Total working hours
 - Total power on hours (Menu No. 908)
 - Total working hours of drum motor (Menu No. 909)
 - Total working hours of capstan motor (Menu No. 910)
 - Total working hours of reel motor (Menu No. 911)
- ② Power off state
 - F. cassette mode or C. cassette mode
 - Existence of a cassette, or not
 - Whether the set has fallen into the warning mode of "02" or "56", or not.
- ③ Set data
 - Set value of loading torque
 - Set value of REV/REW torque
 - Set value of tension warning detecting level

Reel FG Amplifier Circuit

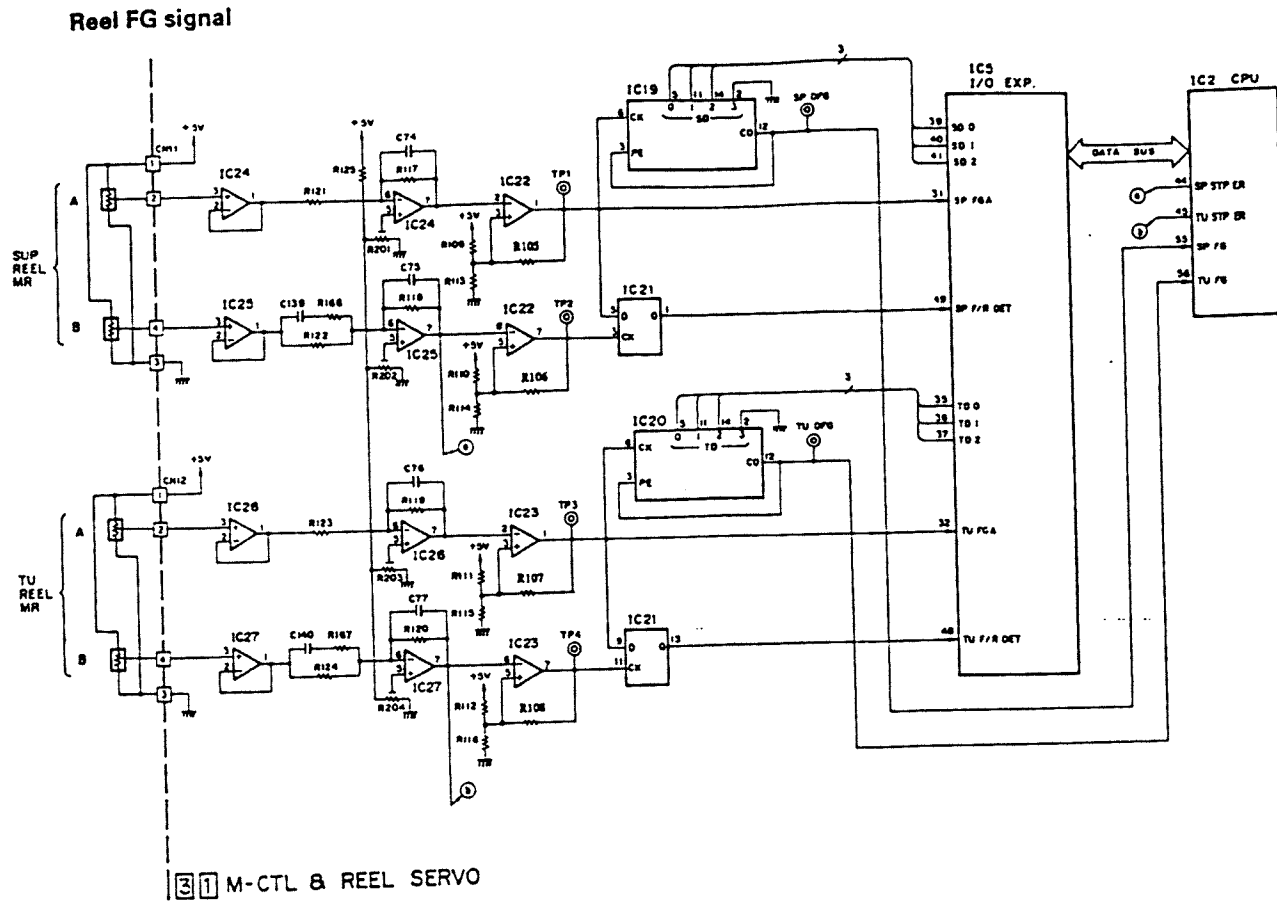


Fig. 4-3-13 Reel FG amp. circuit

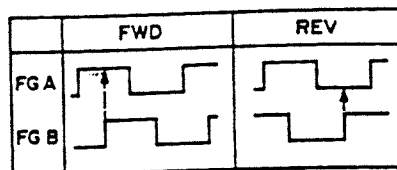
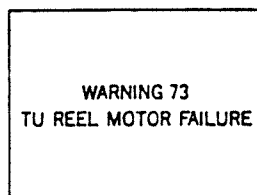


Fig. 4-3-14 F/R detection

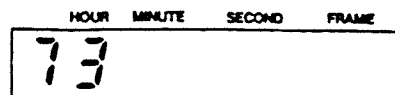
4.2.5 Warning detection

If something wrong occurs in operation, the cause is self-diagnosed and the result is displayed in characters in the monitor screen as well as in a number in the counter display.



Warning indication in monitor screen

However, such a warning does not take place when the Memory switch No. 303 "WARNING INHIBIT" is set to ON. For location of respective switches and sensors, see Fig. 4-2-4.



Warning indication in counter display

Warning Codes

Warning No.	Auto OFF	On screen indication and detail	Operation and result	Detection manner
1E		INVALID OPERATION (displayed for 2 sec) <ul style="list-style-type: none"> When S-VHS recording is intended with VHS cassette. When REC or AUTO EDIT button is pressed with Memory switch No. 304 REC INHIBIT being turned on. 	<ul style="list-style-type: none"> Deck enters PB mode. If REC MODE SWITCH is switched over in the recording mode, the set enters Stop mode. Deck enters Stop mode or PB mode. 	S-VHS cassette detection switch is classified into two of; Full cassette SW ^(e) C. cassette SW ^(f) When S-VHS cassette is inserted into deck, pin ⁽⁶²⁾ of IC5 on M-CTL & RSV board is "H" in level.
01	○	LAMP FAILURE <ul style="list-style-type: none"> When tape end/beginning sensor lamp is burned out or wiring is breaking. 	Deck stops all operations and does not accept further operational commands.	When the sensor LED ^(g) is burned out, pin ⁽⁵¹⁾ of IC5 on M-CTL & RSV board is "L" in level.
02	○	CONDENSATION ON DRUM <ul style="list-style-type: none"> Moisture condensation on drum and in transport 	Cassette is ejected from deck. After cassette ejection, drum revolves automatically and another cassette loading is inhibited until condensation has been eliminated.	When output voltage (pin ⁽⁴⁶⁾ of IC2 on M-CTL & RSV board) of the dew sensor ^(m) is 3 V DC or higher, the deck enters warning mode, while it proceeds to normal operation with voltage drop to under 2 V DC.
04	○	REEL SERVO FAILURE <ul style="list-style-type: none"> When power (± 12 V) for tape tension detection circuit is not supplied. 	All operations stop and further operational command is not accepted.	When pin ⁽⁵⁰⁾ of IC5 on M-CTL & RSV board is "H" in level, the deck enters warning mode.
08	○	SUP TENSION FAILURE <ul style="list-style-type: none"> When something abnormal in the supply tension servo. 	All operations stop and further operational command is not accepted.	<ul style="list-style-type: none"> When tension error voltage keeps the specified value for a certain period of time. When tape forwarding is 1.5 times as much as tape winding in amount in the reel search mode.

Warning No.	Auto OFF	On screen indication and detail	Operation and result	Detection manner
32		FAILURE LOADING • Tape cannot be loaded correctly.	Eject loaded cassette. Again insert it again, and warning will be cancelled and deck will operate normally.	M-CTL CPU checks output of the mode sensor (n), and if loading does not finish in a certain period, it sets up eject mode. (See Fig. 4-2-2.) If loading does not take place despite of the above-stated setup operation, "Warning 32" is displayed.
33	○	FAILURE UNLOADING • Tape cannot be unloaded.	All operations stop and further operational command is not accepted.	M-CTL CPU checks output of the mode sensor (n), and if loading does not finish in a certain period, it sets up warning mode. (See Fig. 4-2-2.)
41	○	CASSETTE EJECT FAILURE • Cassette is not lifted up for ejection.	All operations stop and further operational command is not accepted.	M-CTL CPU checks outputs of cassette switches (p), (q) and if cassette eject does not finish in a certain period, it sets warning mode. (See Fig. 4-2-1.)
56		TAPE DEFECTIVE • When tape end and beginning are detected at the same time because of tape damage, etc.	Eject loaded cassette. Again insert it again, and warning will be cancelled and deck will operate normally.	Warning mode takes place when both levels of the begin sensor (c) and the end sensor (d) become "L".
57		END LEADER DETECTION • Condition of tape end detection still continues 3 seconds or more after Short REW/REV operation following tape end detection.	Eject loaded cassette. Again insert it again, and warning will be cancelled and deck will operate normally.	Tape end is detected by the end sensor (d).
58		BEGIN LEADER DETECTION • Condition of tape beginning detection still continues 3 seconds after Short FF/FWD operation following tape beginning detection.	Eject loaded cassette. Again insert it again, and warning will be cancelled and deck will operate normally.	Tape beginning is detected by the begin sensor (c).
70	○	DRUM MOTOR FAILURE • Drum motor stops rotation.	All operations stop and further operational command is not accepted.	Warning mode takes place if DRUM FG is not supplied to pin (10) (TP6) of IC20 (Servo CPU) on D/C SERVO board for 1 second or longer.

Warning No.	Auto OFF	On screen indication and detail	Operation and result	Detection manner
71	○	CAPSTAN MOTOR FAILURE • Capstan motor stops rotation.	All operations stop and further operational command is not accepted.	Warning mode takes place if CAPSTAN FG signal is not supplied to pin ⑨ of IC20 on D/C SERVO board for 1 second or longer.
72	○	SUP REEL MOTOR FAILURE • Supply reel motor stops rotation.	All operations stop and further operational command is not accepted.	Warning mode takes place if SUPPLY REEL FG is not supplied to pin ⑤⑤ of IC2 (M-CTL CPU) on M-CTL & RSV board.
73	○	TU REEL MOTOR FAILURE • Take-up reel motor stops rotation.	All operations stop and further operational command is not accepted.	Warning mode takes place if TAKE-UP REEL FG is not supplied to pin ⑤⑥ of IC2 (M-CTL CPU) on M-CTL & RSV board.

Table 4-2-5 Warning detection manner


Safely Removing a Cassette

1.7 WHEN IN TROUBLE

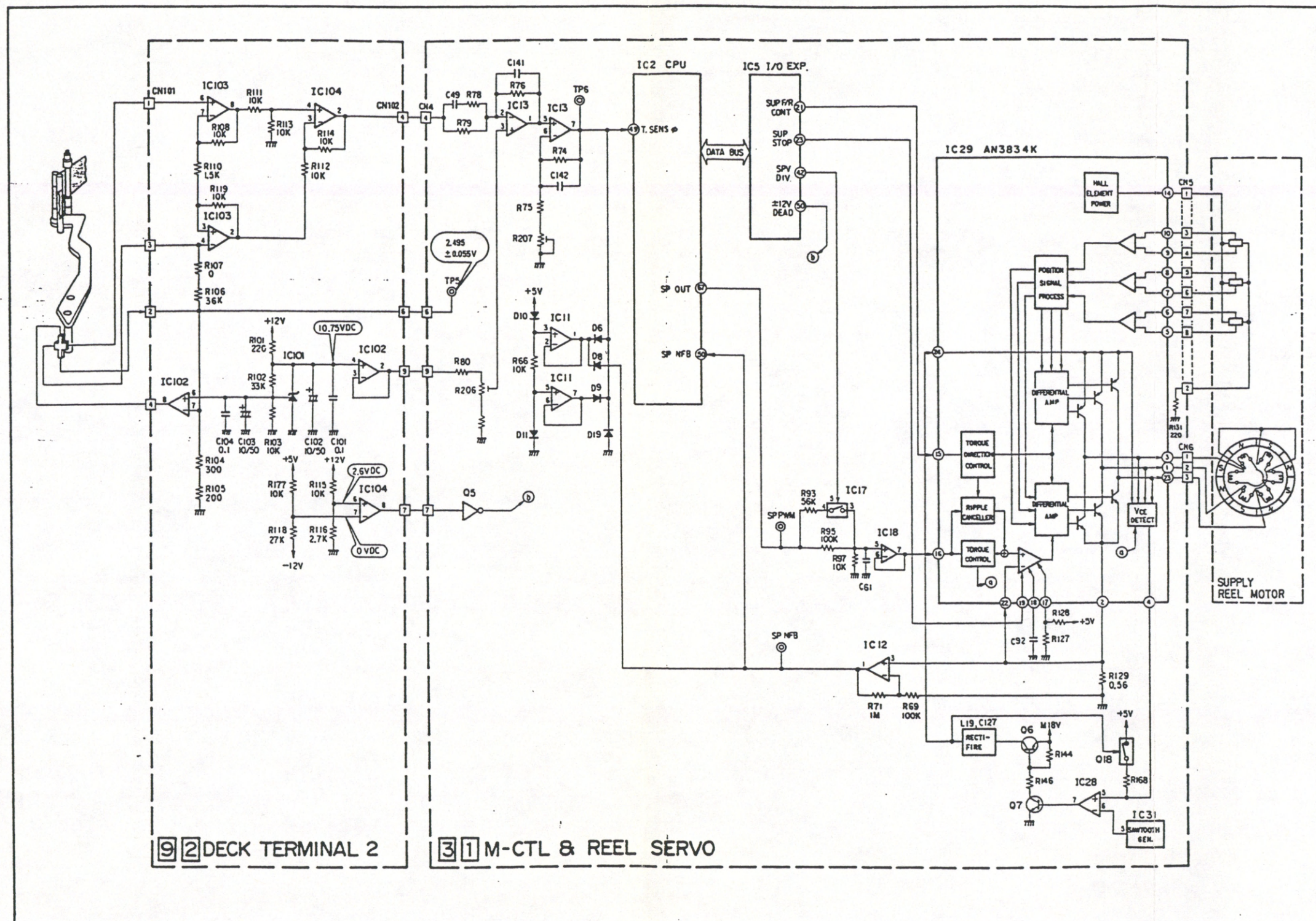
1.7.1 To take cassette out of set manually

If a loaded tape cannot be ejected because of electrical failure, etc., take it out in the following manner.

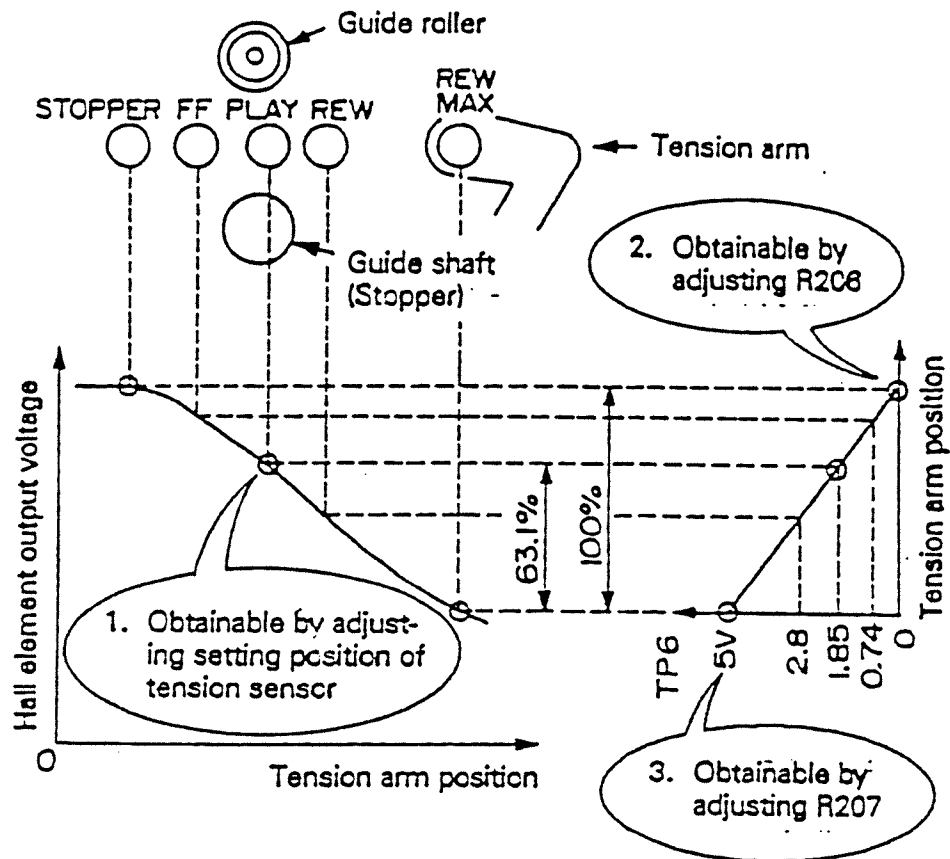
1. Turn off the power and remove the top cover.
2. Open the operation panel and set SW1-4 on **3 1** M. CTL & R. SERVO board to ON.


3. Turn on the power and the mode becomes to emergency roll mode.
4. Depress the tact switch SW2 on the M. CTL board while rotating the loading motor clockwise. The mechanism starts unloading while taking in the slack of the tape.
5. After the mechanism returns to the loading end position, turn the gear of the cassette housing clockwise and take out the cassette tape. If it is hard to turn the gear, remove the cassette panel and do the same.

Tension Servo



Hall Effect element's output voltage Adjustment



Hall element output voltages

Tension Adjustments for the 22 Series Professional VTRs

JVC is announcing an alternate method of performing tension adjustments on the BR-S822U, BR-S622U, BR-S522U, and BR-S525U using the Tentelometer® [model T2-H7UM (UMC)]. This procedure was developed to help the authorized servicers who are more comfortable using a Tentelometer, even though the preferred method is to use torque tapes. The following pages contain step by step instructions and flow charts for performing tension adjustments.

Tentelometer Calibration

The following tension adjustments use a calibrated Tentelometer. In order to adjust the Tentelometer, attach a 1 ounce weight to a 30cm long S-VHS tape. Pull the tape upward through the prongs at normal tape speed (about 3 cm per second) as shown in the figure. Calibrate the Tentelometer by adjusting the hex screw to indicate 1 ounce while pulling upward. After calibrating the Tentelometer perform the following steps in sequence:

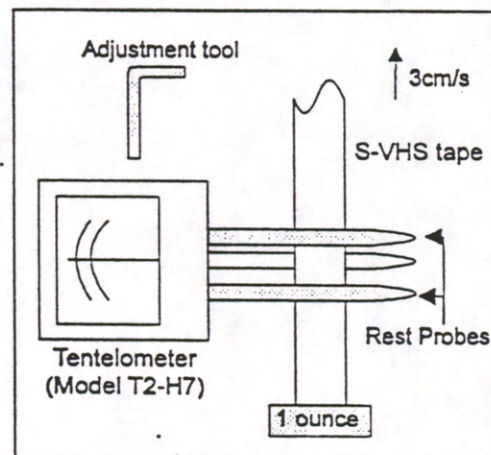
Step 1. Tension Sensor Position: See page 2-17 of service manual 9246C.

Step 2. Hall Element Output Bias: See page 2-18 of service manual 9246C.

Step 3. Hall Element Output Gain: See page 2-18 of service manual 9246C.

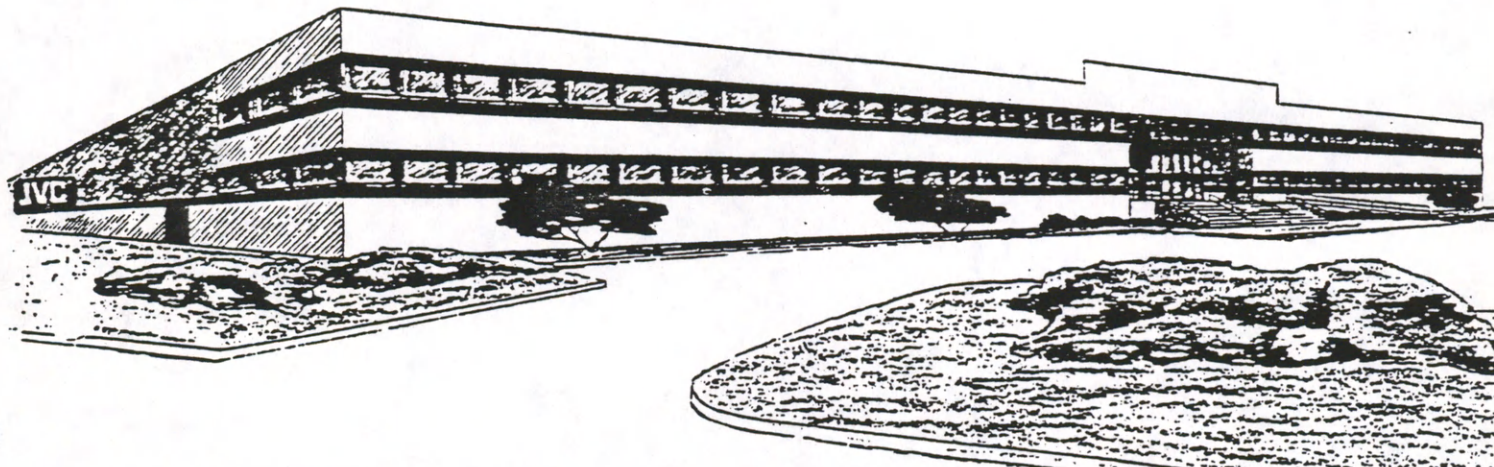
Notes:

- Remove the full erase head in the BR-S622U and BR-S822U prior to performing the adjustments.
- All tension adjustments must be performed using the first two minutes of a T-120 S-VHS tape.
- For good stability of the Tentelometer, press one of its Rest Probes against the full erase head mount when measuring tape tension.



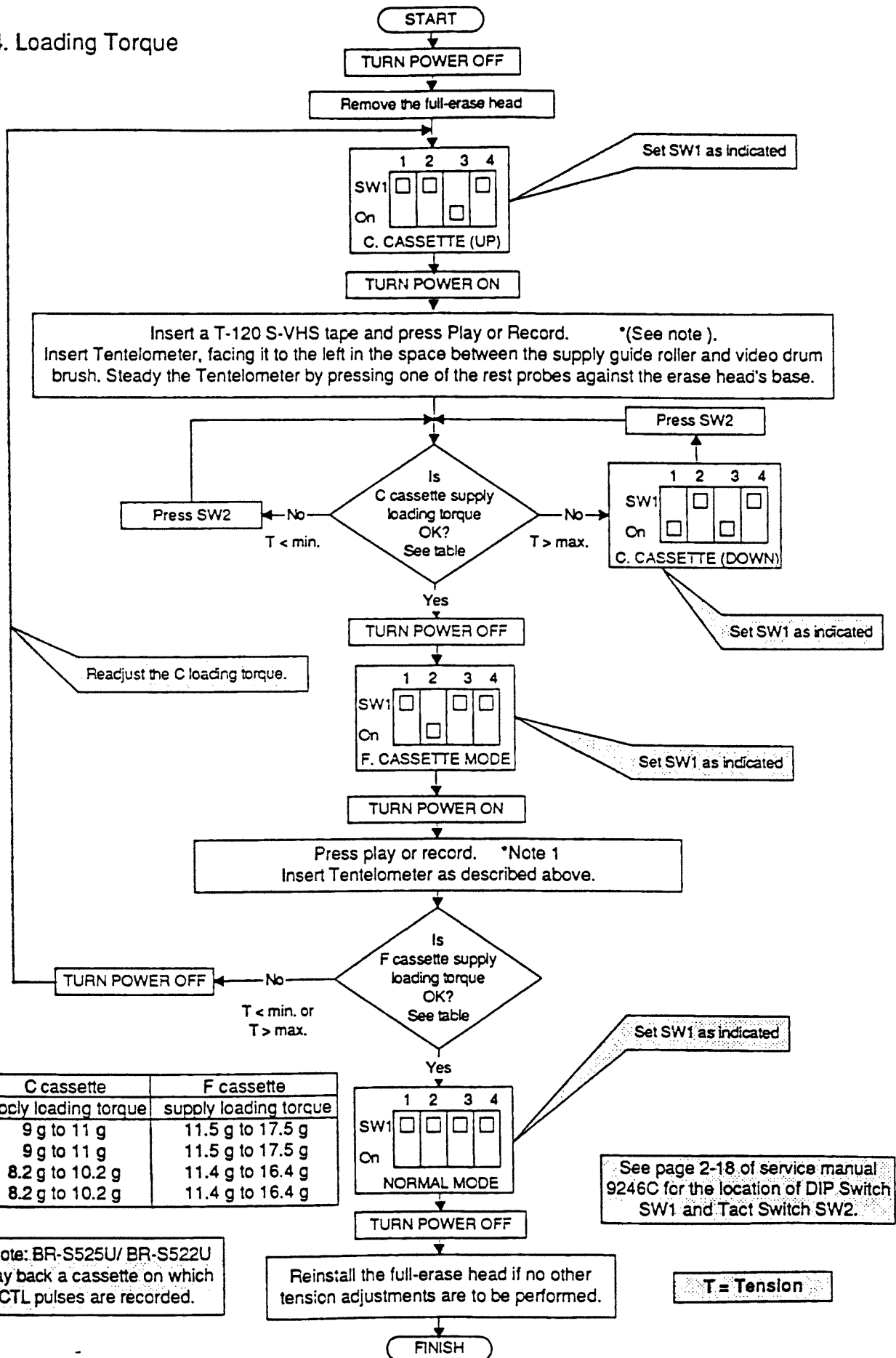
Continued on the next page

**Tentel and Tentelometer are registered trademarks of the Tentel Corp.*



Tension Adjustments Continued

Step 4. Loading Torque

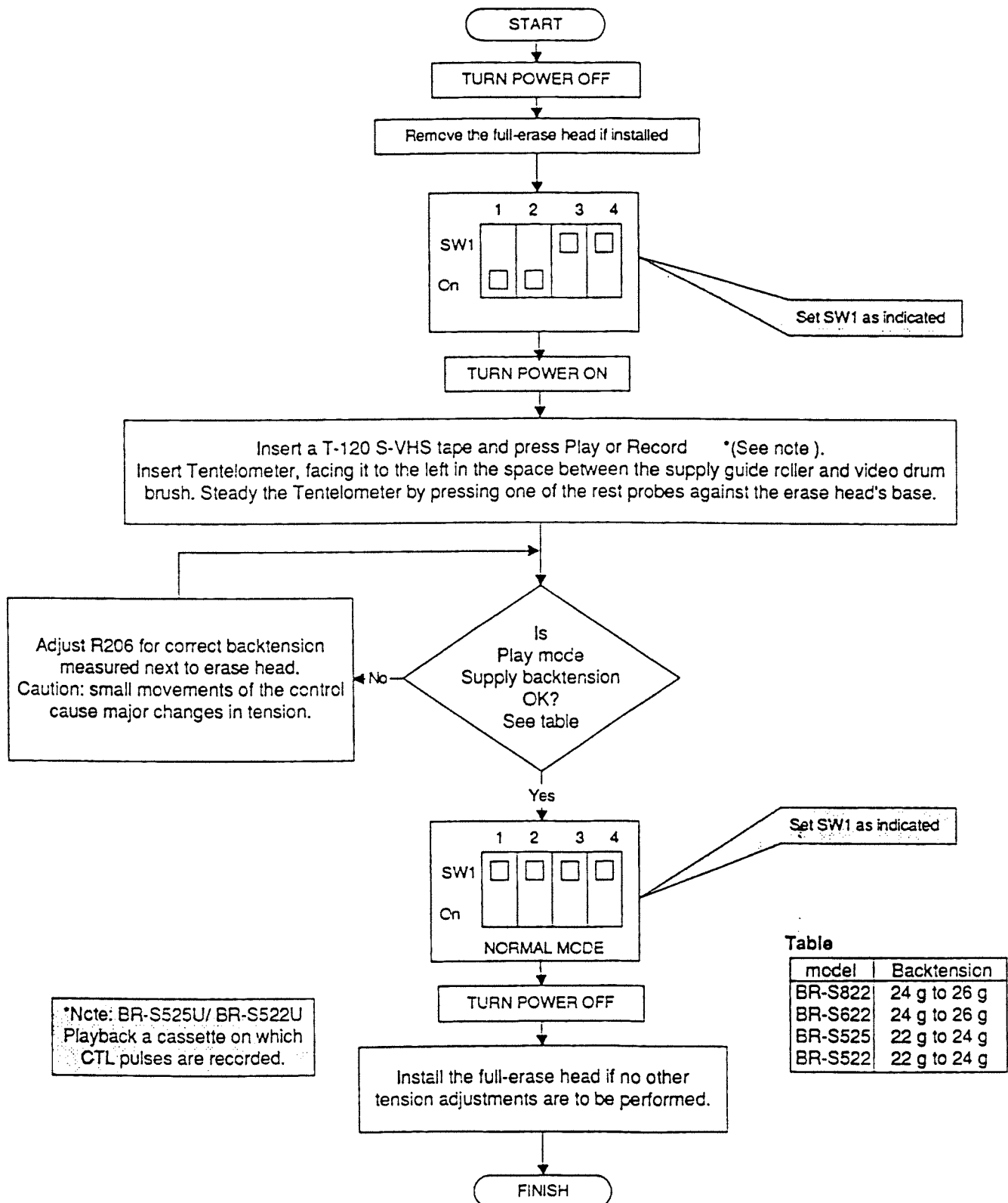


Tension Adjustments Continued

Step 5. Reel FG Duty

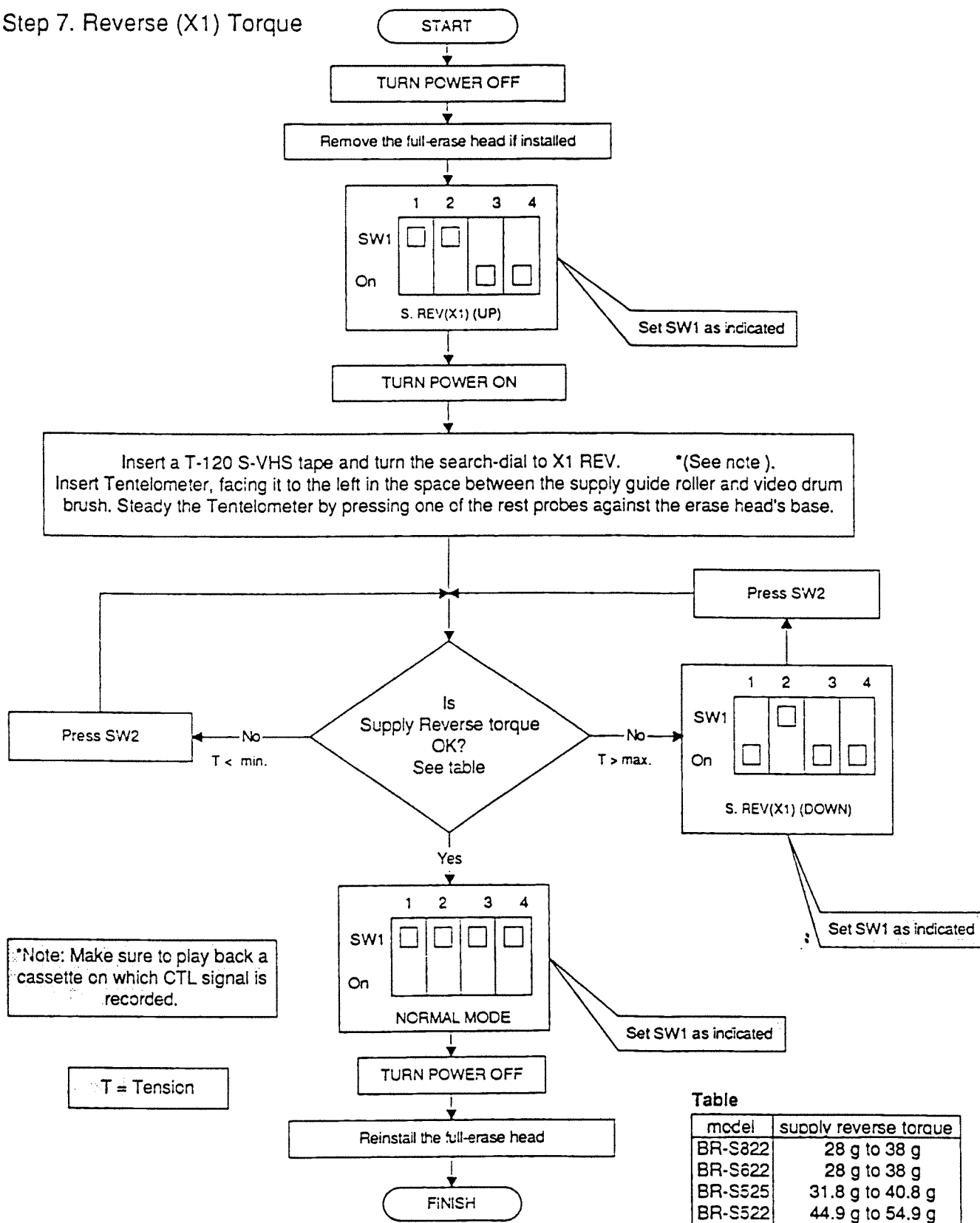
See page 2-20 of service manual 9246C

Step 6. Play Mode Backtension



Tension Adjustments Continued

Step 7. Reverse (X1) Torque



Step 8. Tension Warning Data Setting

See page 2-21 of service manual 9246C.

Reel Servo Modes

4.3.1 Control operations of reel servo in respective modes

	LOAD	UNLOAD	PLAY	SEARCH FWD	SEARCH REV	REEL SEARCH FWD	REEL SEARCH REV	STILL (STANDBY STOP)	STANDBY OFF
Supply side	Constant torque ↓ Simple tension servo	Constant torque	Tension servo	←	←	←	Constant speed servo	Tension servo	Torque: 0
Take-up side	Stop servo	←	Constant tension (open loop)	←	←	Constant speed servo	Tension servo	Constant tension (open loop)	Stop servo

Table 4-3-1 Reel servo modes

The M-CTL CPU controls the reel motors for respective modes as indicated in Table 4-3-1.

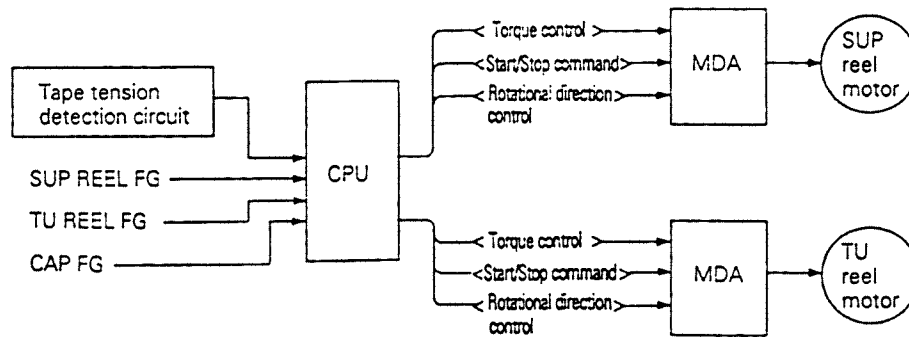
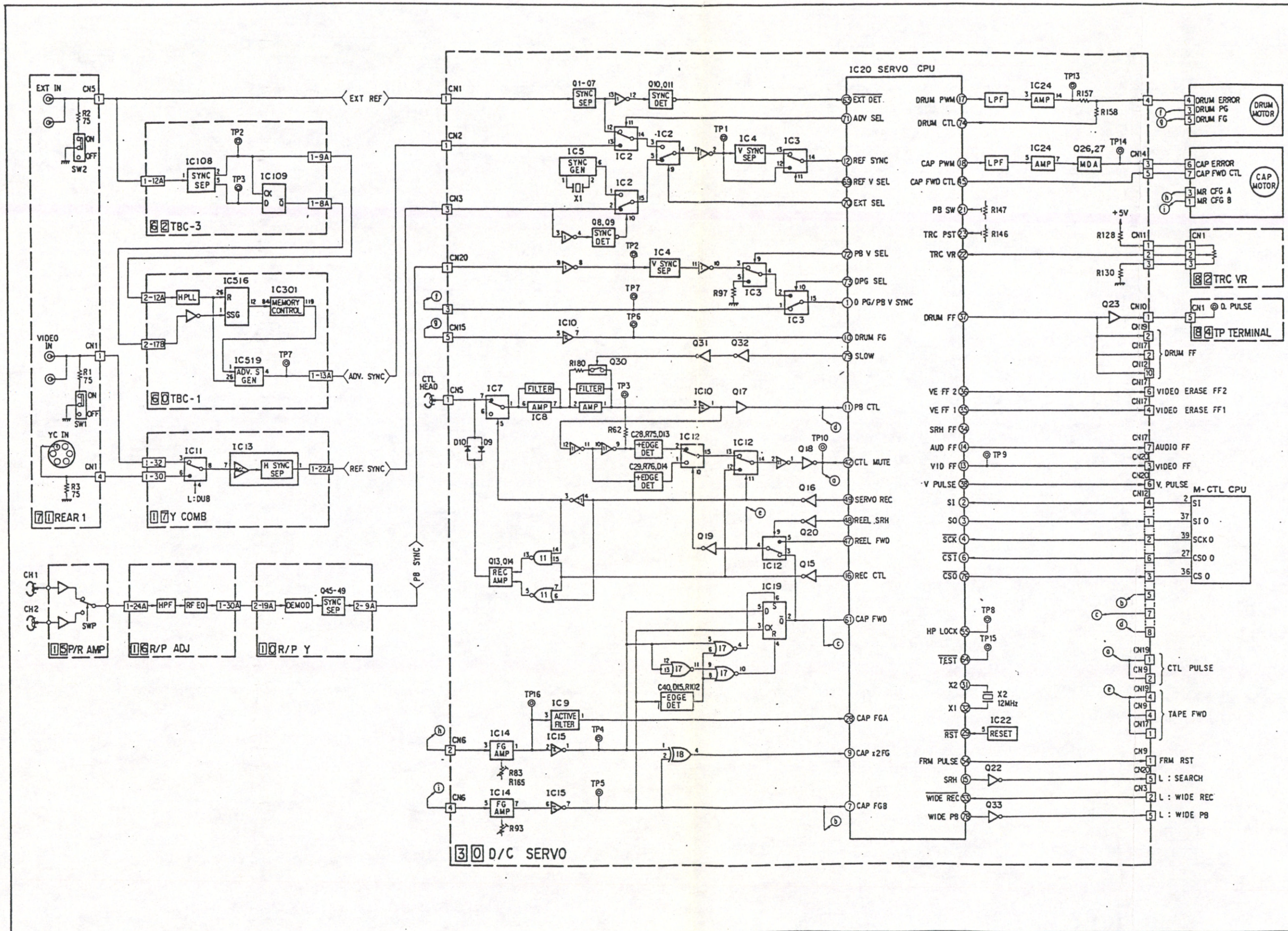
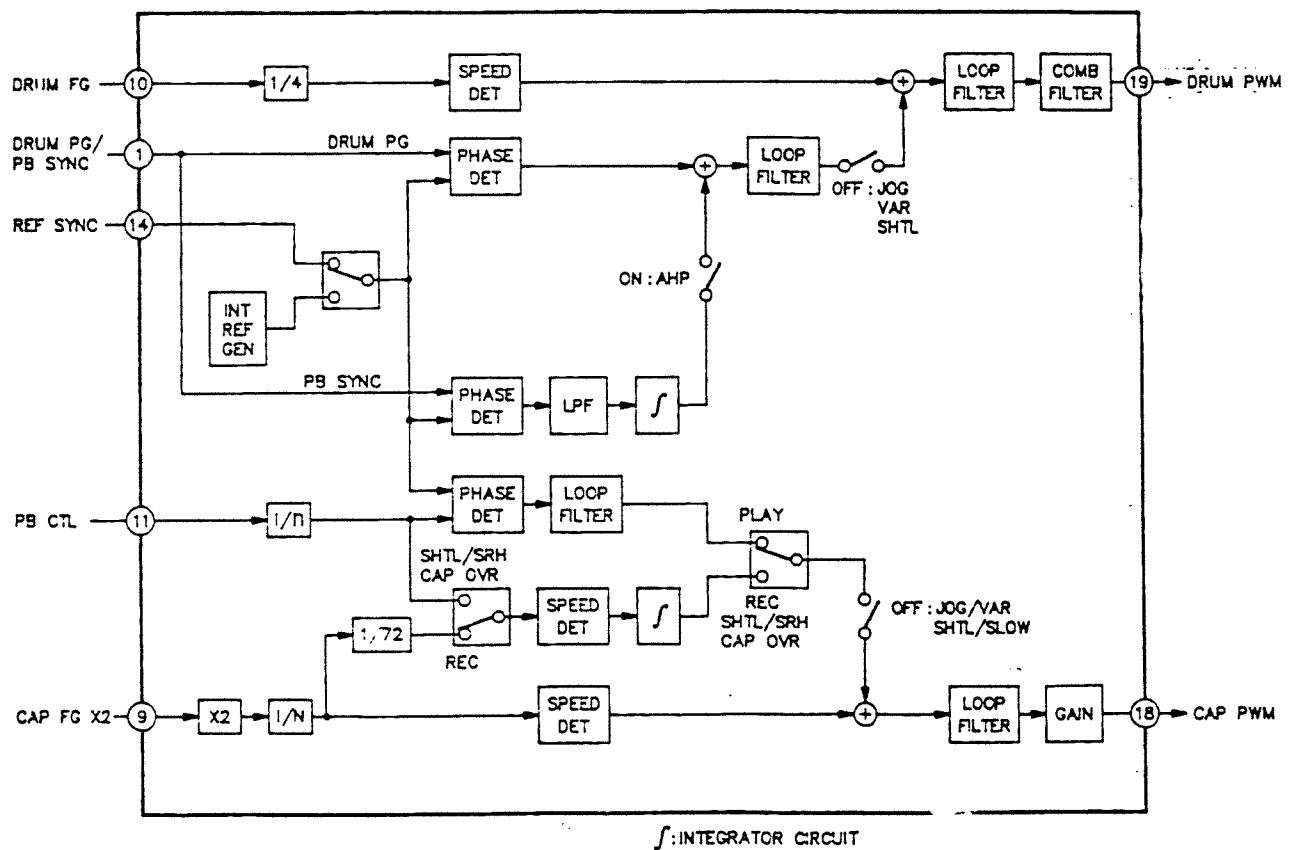


Fig. 4-3-2 Outline of reel servo circuit

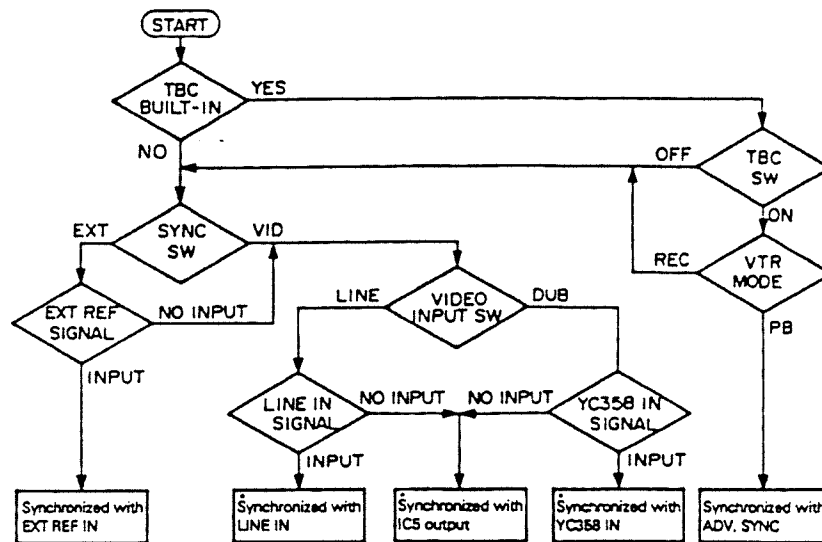
Drum and Capstan Servo





Drum and Capstan Block Diagram

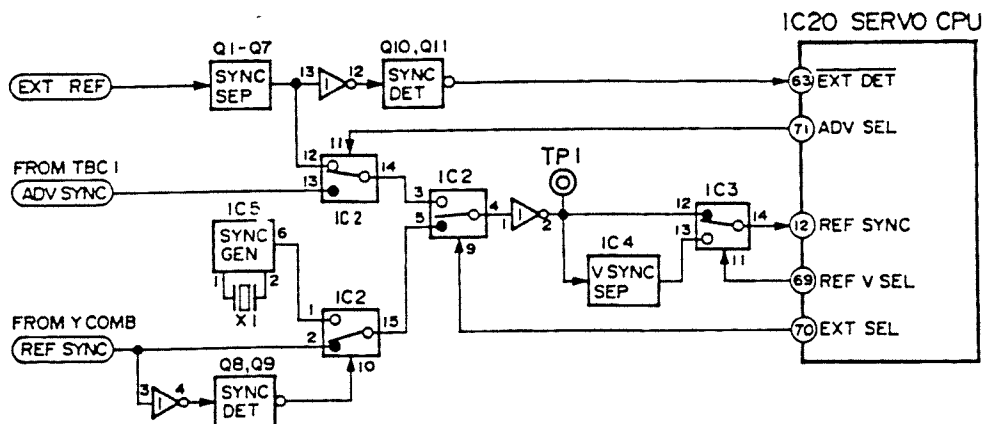
Servo Reference Select Flow Chart



Note 1: "REC mode" in the figure should be interpreted as condition with VINS, ASB or REC LED on.

Note 2: • In x1 search mode, the forced internal sync mode synchronized with reference signal generated by the servo CPU takes place.

Servo Reference Select circuit



Reference Signal input Timing diagram

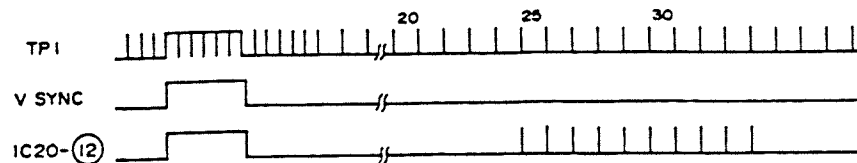


Fig. 5-3-4 Reference signal switching timing

Drum Servo Comparison Signal input timing diagram

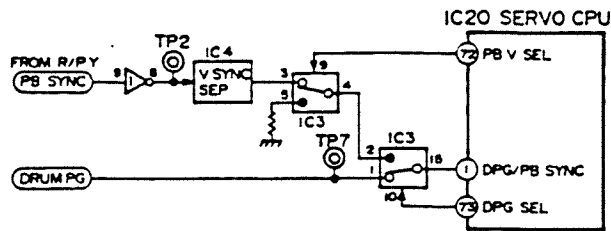
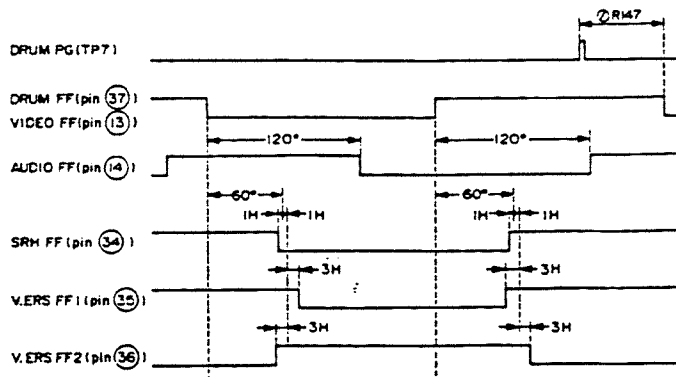
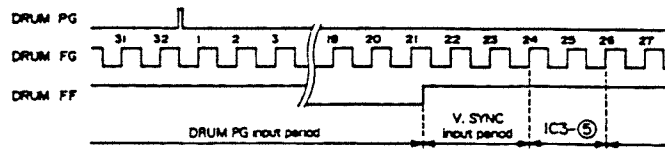


Fig. 5-3-5 Comparison signal selector circuit



Rec/PB mode upper drum FFs Timing Diagram

Wide ID Circuit

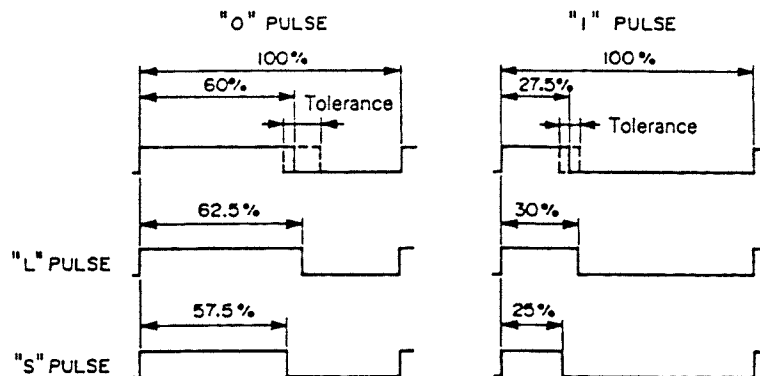
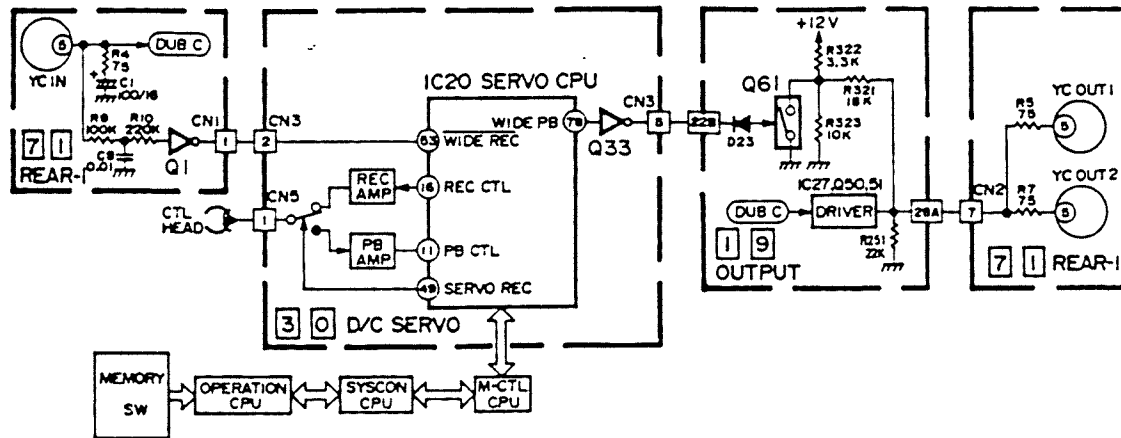


Fig. 5-5-1 Duty ratio of CTL pulse

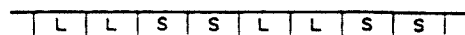
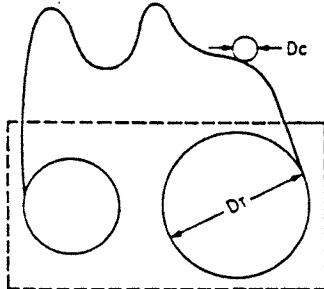


Fig. 5-5-2 Wide aspect ID

Remaining Tape Detection

4.2.6 Detection of wound tape amount in diameter

Diameter of tape wound up in the reel is found from number of CAPSTAN FG pulses per round of the reel motor. The following explains about the take-up side by way of example.



- DT : Diameter of tape wound in take-up reel
 DC : Diameter of capstan shaft (3.53 mm)
 P : Number of FG per round of capstan motor (720 pulses)
 N : Number of CAPSTAN FG per round of take-up reel (a round = 120 pulses* of REEL FG)
- 60 pulses are counted in practice since the CPU receives REEL FG whose frequency is half reduced by IC20.

Fig. 4-2-6 Detection of wound tape amount in diameter

From the tape length wound per round of the take-up reel, the following equation can be set up.

$$\pi DT = \frac{N}{P} \times \pi DC$$

Circumference of capstan shaft
 Number of revolution of capstan shaft
 per round of take-up reel
 Tape winding amount per round of
 take-up reel

$$\therefore DT = DC \times \frac{N}{P}$$

Therefore, diameter of tape wound in the take-up reel is found. When the C. cassette tape is loaded, the diameter can also be found since cogs of respective gears are constant in number as shown in Fig. 4-2-7. In this case, N in the above equation is replaced with a number of CAPSTAN FG that TAKE-UP FG is counted $120 \times 6/11$ times since the reel disk turns 6/11 round as the take-up reel turns a round.

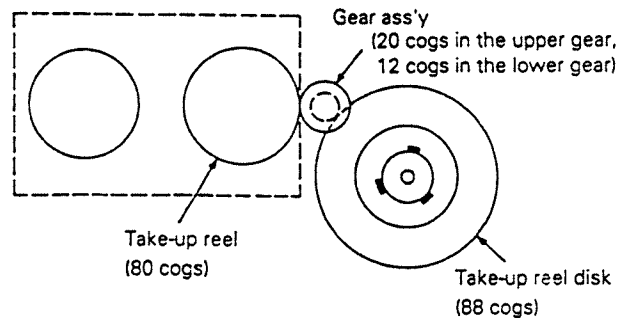


Fig. 4-2-7 Number of cogs of respective gears

4.2.7 EEPROM (M6M80011AP)

IC5 I/O		IC4 EEPROM		
		Symbol	Pin Name	Function
\overline{CS}	13	① CS	CHIP SELECT INPUT	"L": Chip selecting
EE RST	16	⑥ RESET	RESET INPUT	"H": Reset of sequential controller write circuit and memory protection
\overline{SCK}	14	② SCK	CLOCK INPUT	Input data read in the leading edge of the clock Data output synchronously with fall of the clock
DO	15	③ DI	DATA INPUT	Data input terminal
DI	12	④ DO	DATA OUTPUT	Data output terminal
\overline{BUSY}	11	⑦ R/B	BUSY OUTPUT	"L": In execution of data write In power on/off operation, level is "L" to inhibit all data read.

Fig. 4-2-8 IC4 pin functions

Video Signal Block Diagram in Record Mode

.2 SIGNAL FLOW

.2.1 Signal flow in REC mode

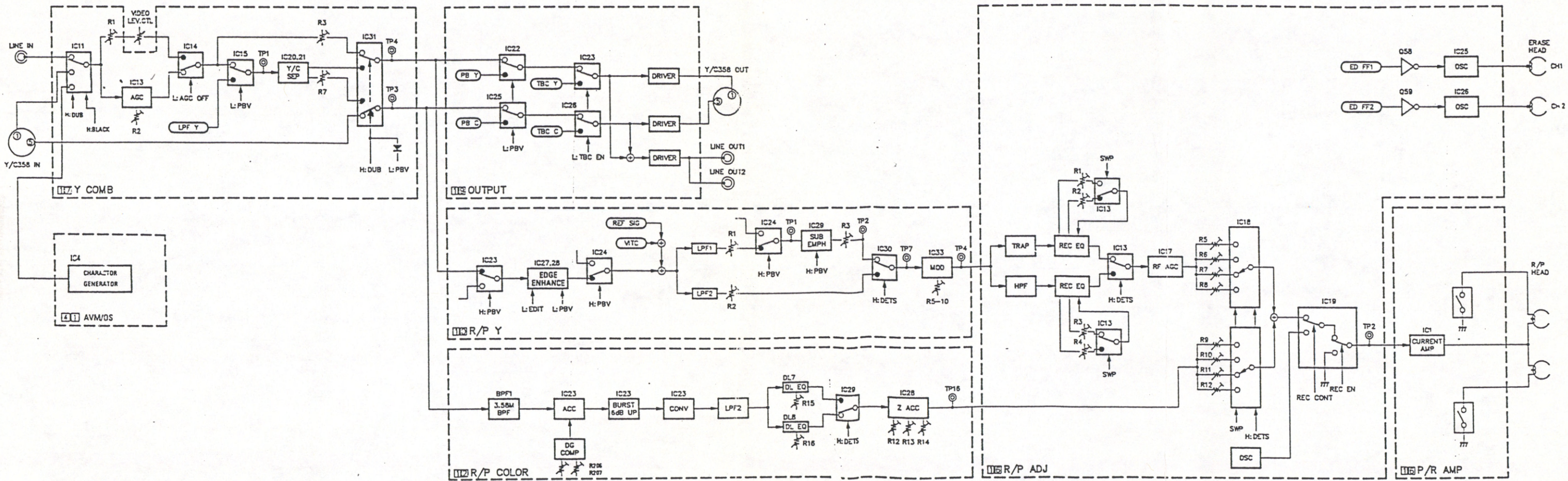
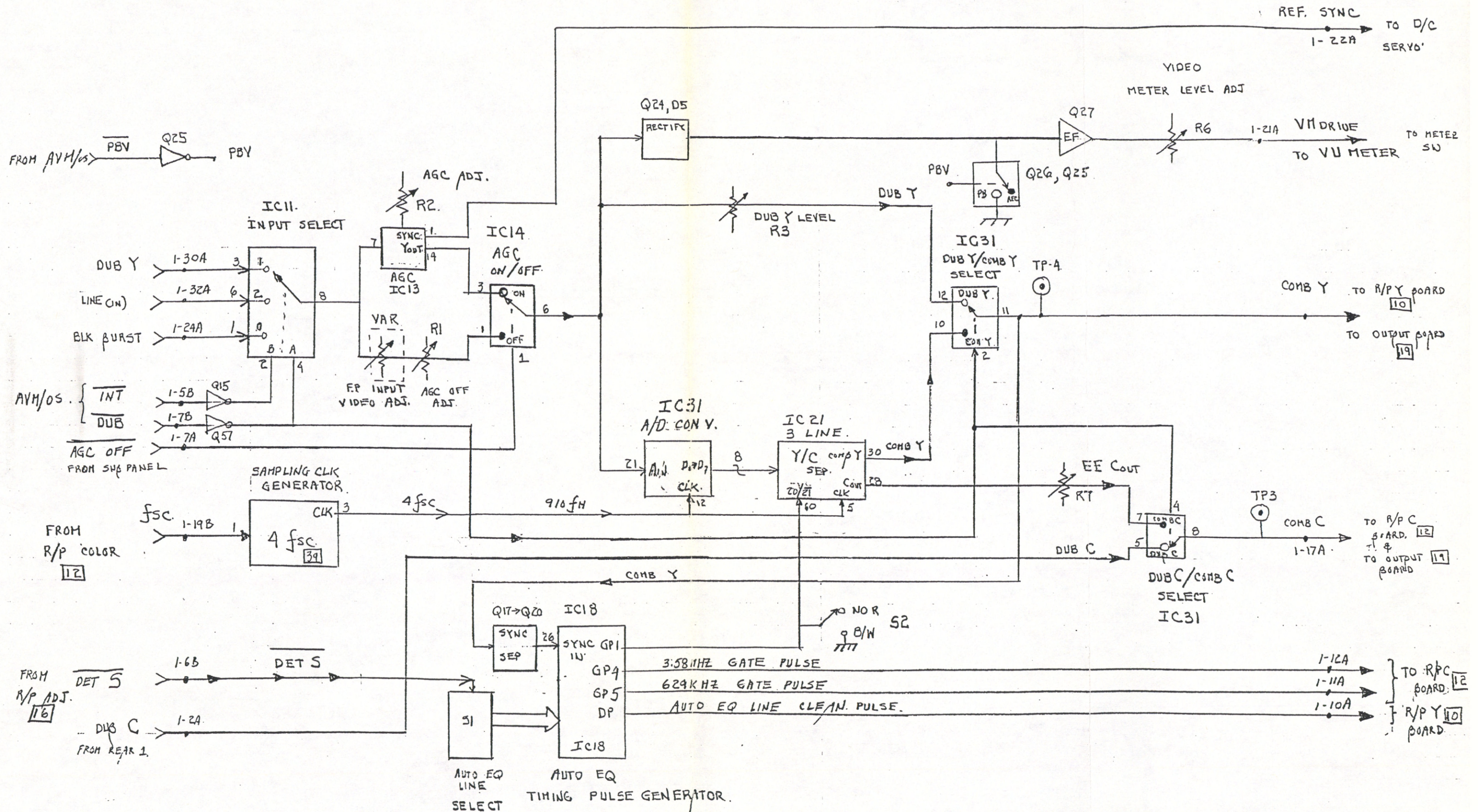


Fig. 6-2-1 Signal flow in REC mode

6-1

6-1

Rec Mode - Y Comb Block Diagram



6.3 Y/C SEPARATOR/PB Y COMB FILTER CIRCUIT

DUB Y LEVEL

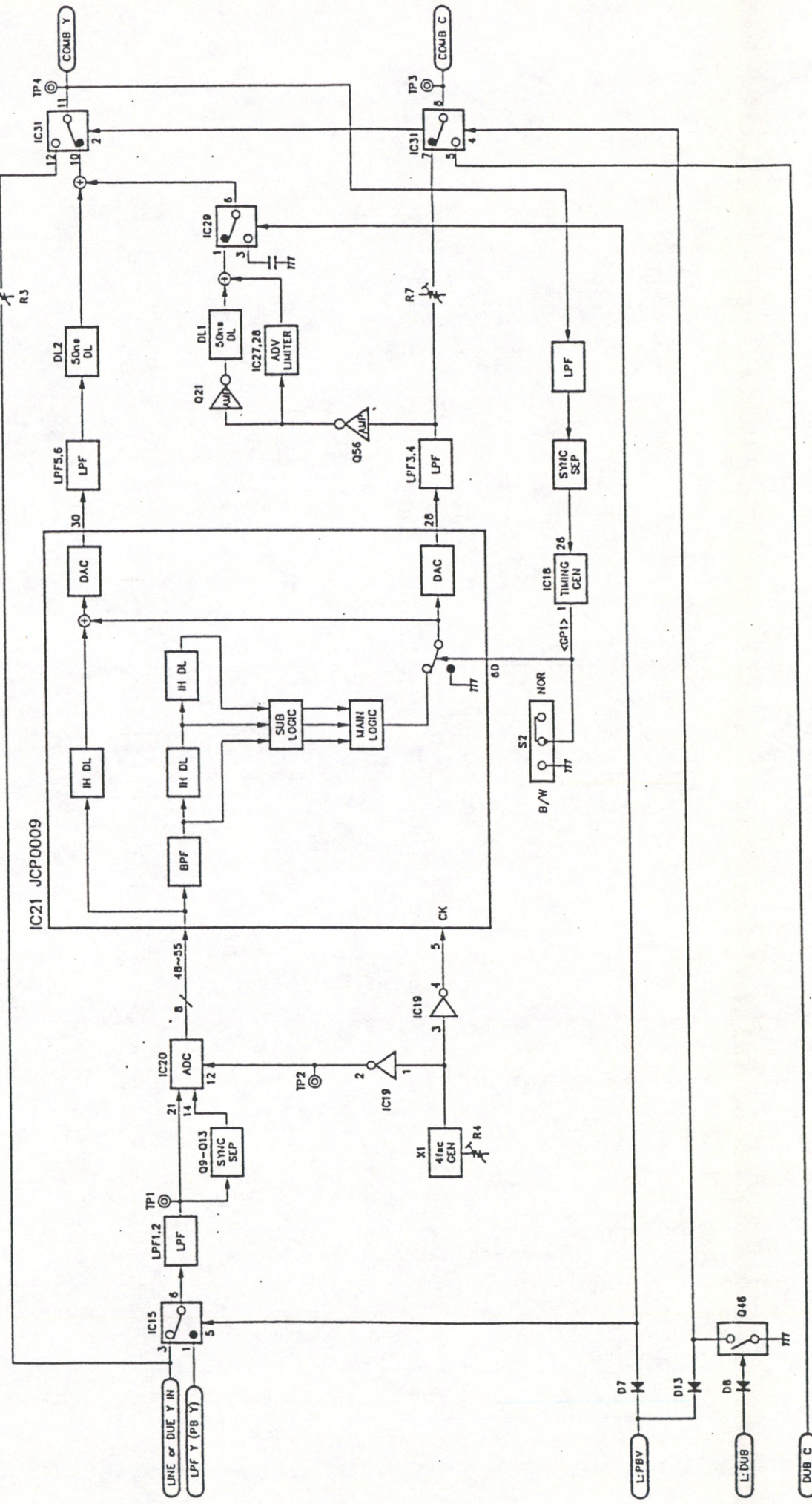


Fig. 6-3-1 Y/C separator circuit

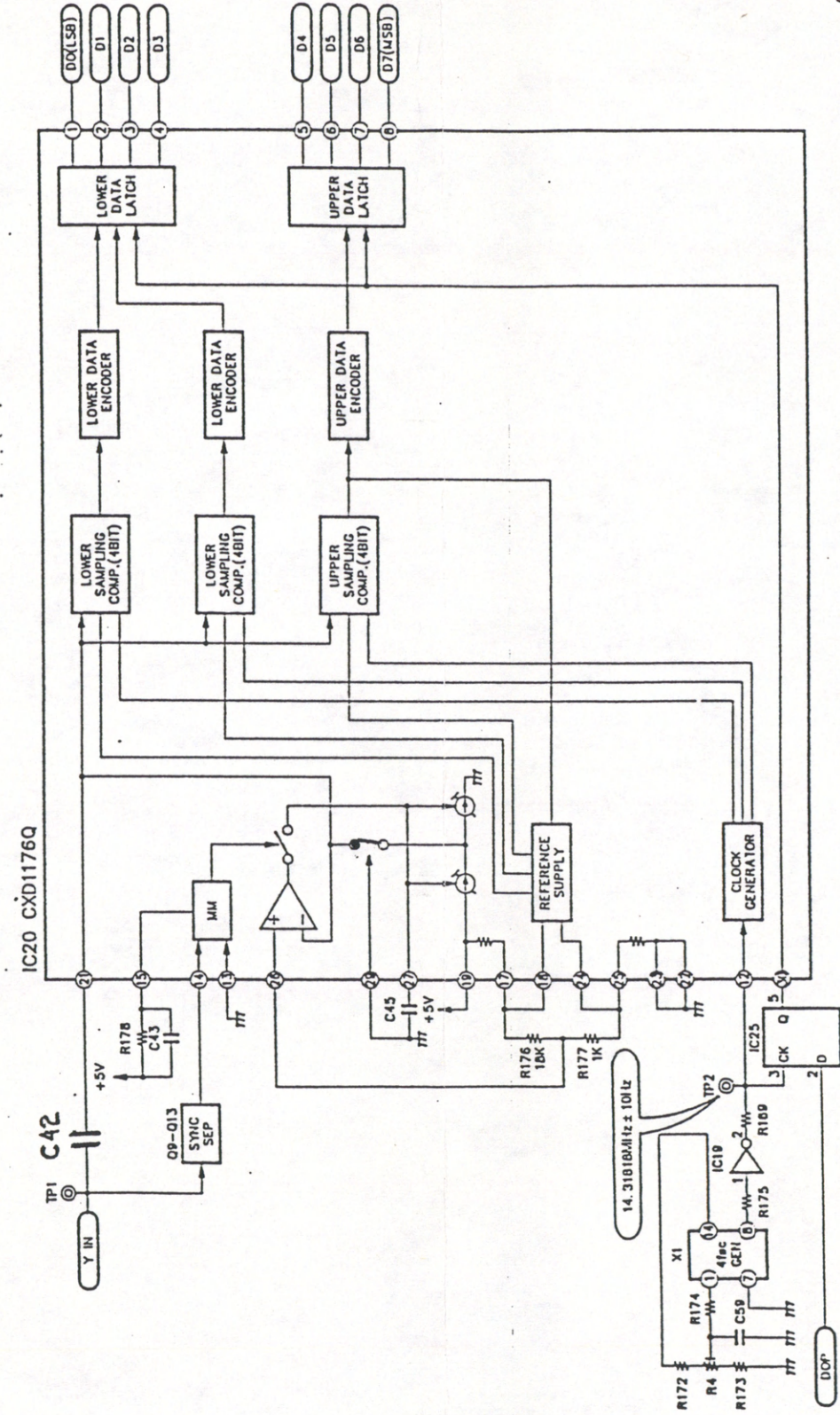


Fig. 6-3-2 A-D converter circuit

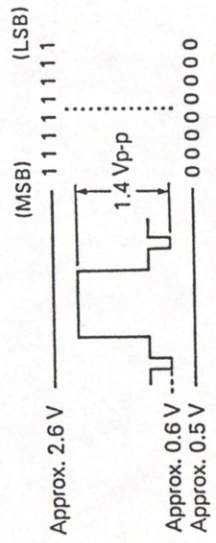


Fig. 6-3-3 A-D converter input waveforms

Auto EQ Circuit Reference Signal Generator

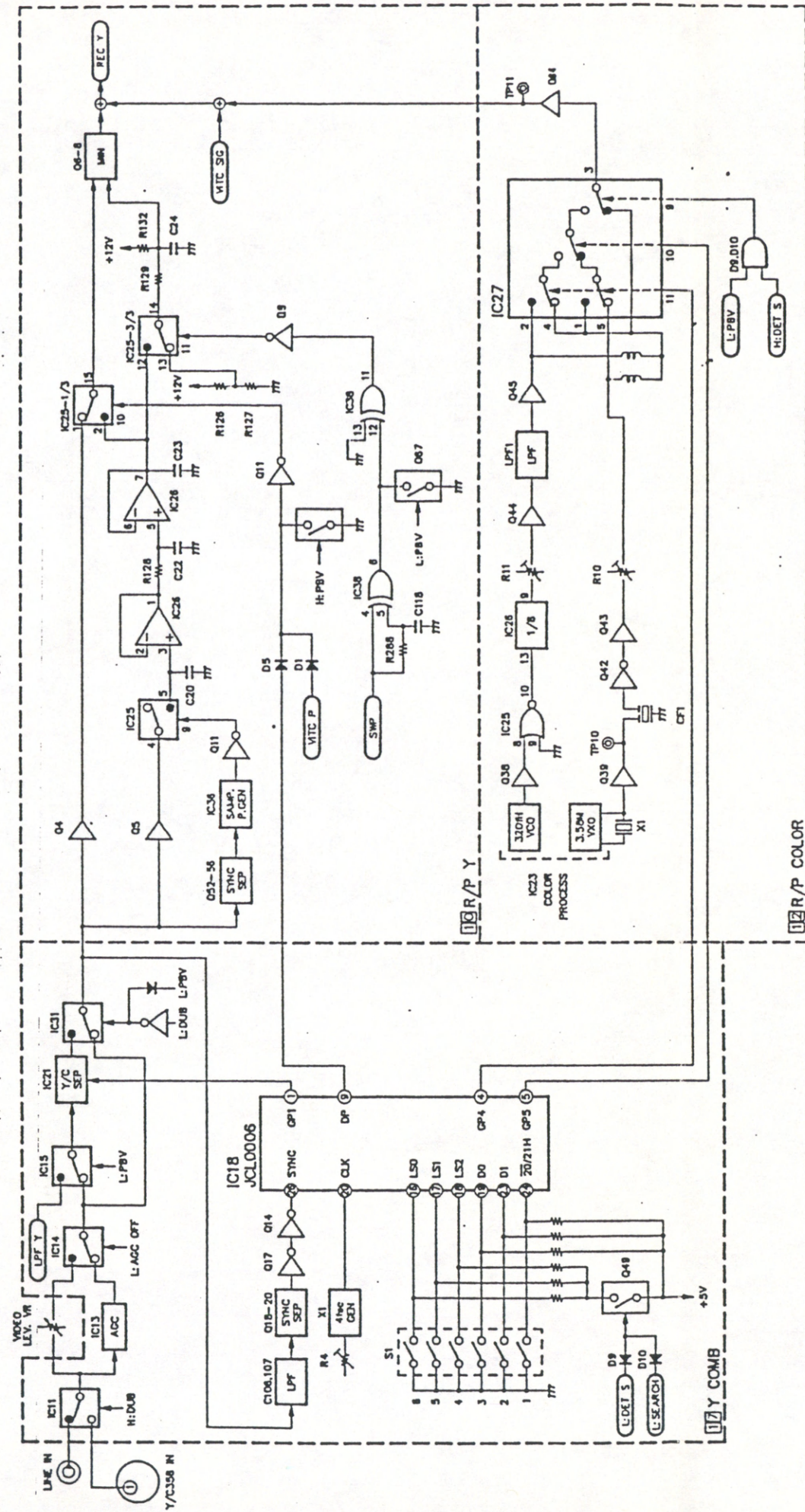
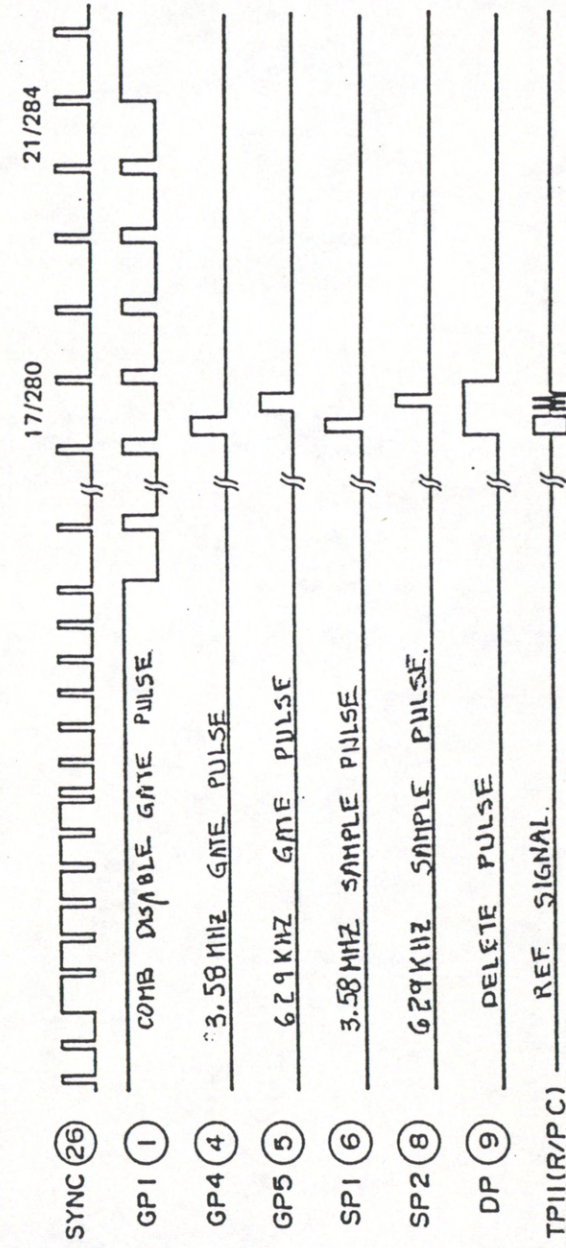


Fig. 6-10-1 Reference signal generator circuit

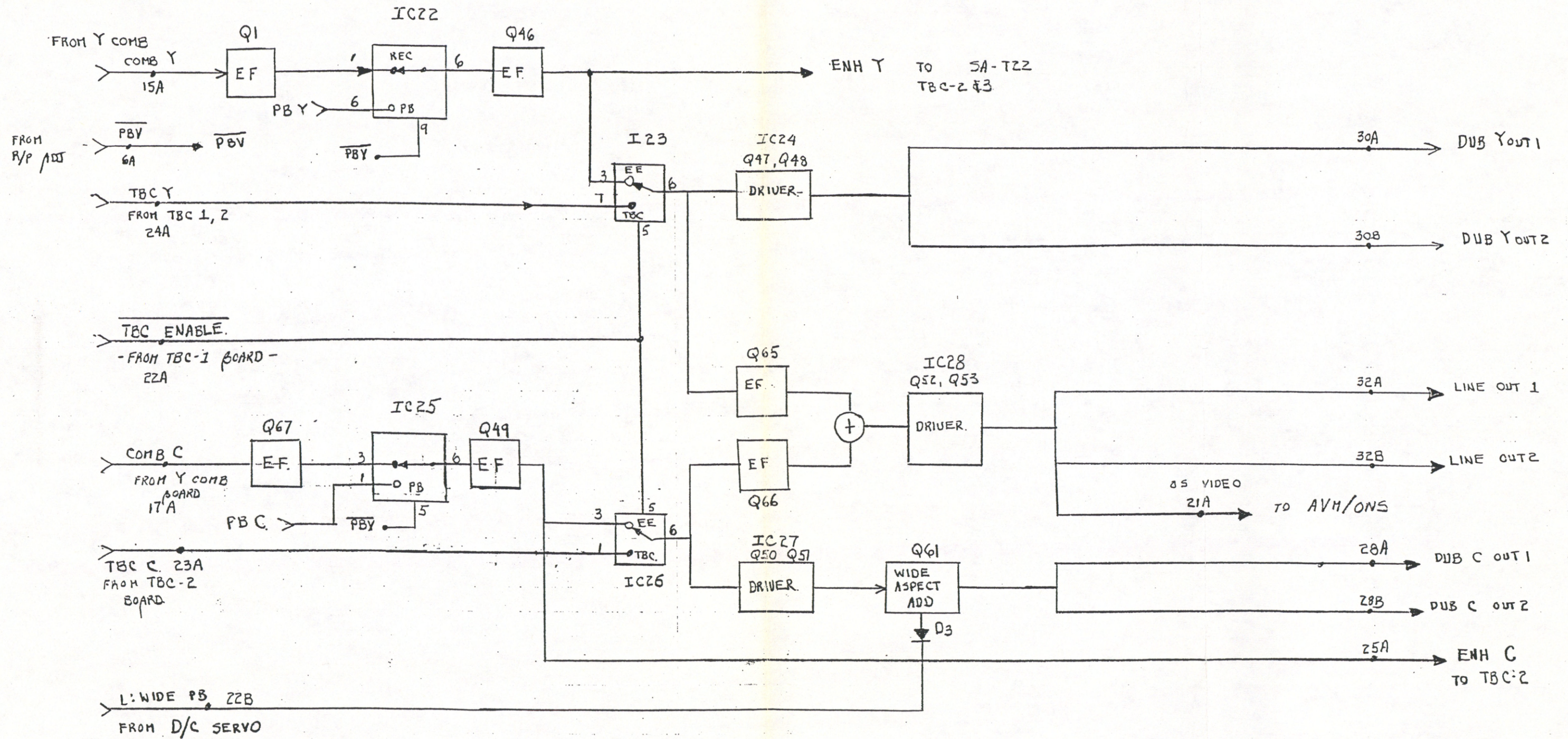


(S1: Initial setting at shipment)

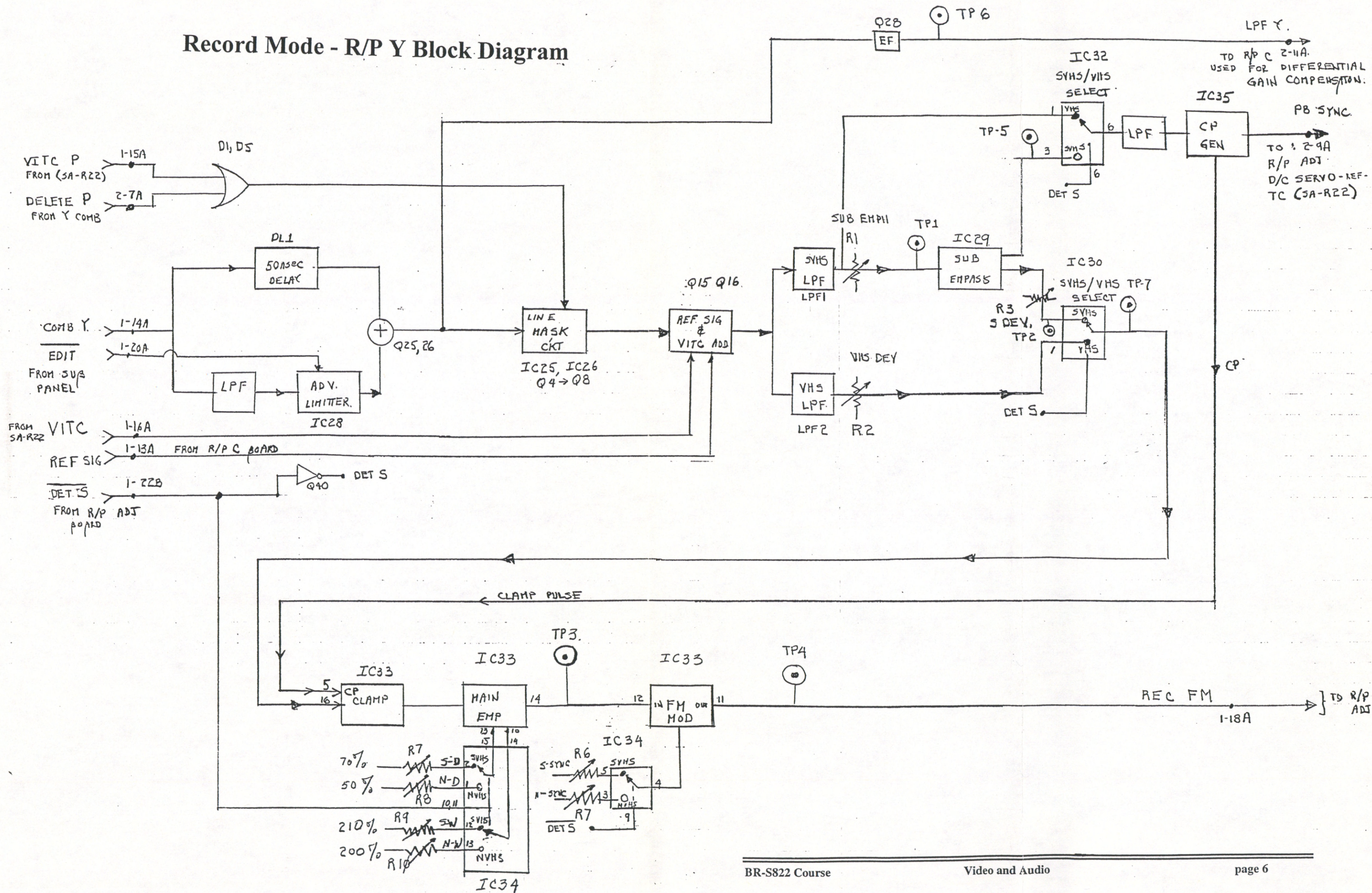
Fig. 6-10-2 IC18 (Y COMB board) timing chart. REF LINE SELECT -

SW1		Reference signal addition line
4	5	
ON	ON	Non-addition 14 H 15 H 16 H
ON	ON	
ON	OFF	
ON	ON	
OFF	ON	17 H
ON	OFF	18 H
OFF	ON	19 H
OFF	OFF	20 H

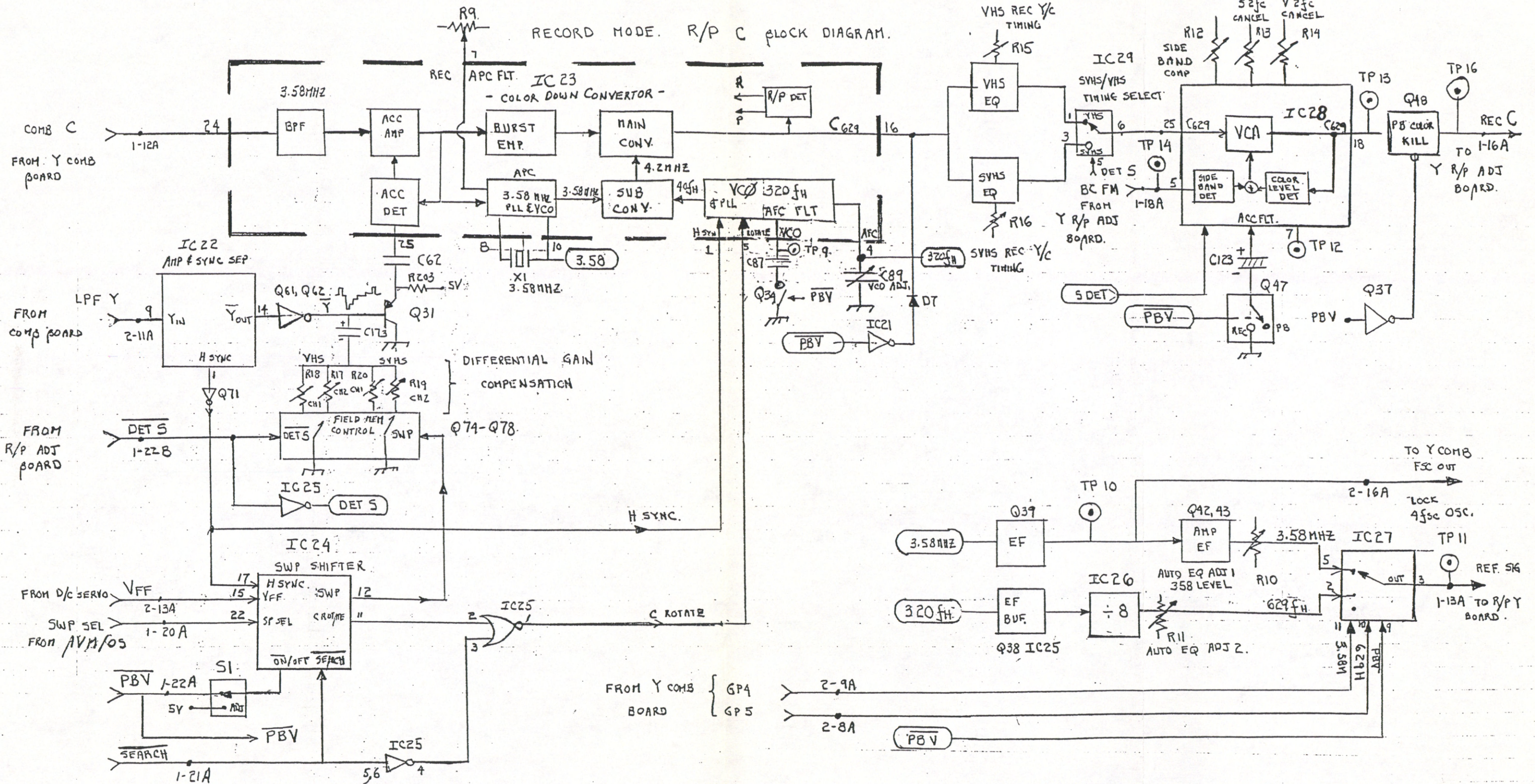
Record Mode - Output Block Diagram



Record Mode - R/P Y Block Diagram



Record Mode - R/P C Block Diagram



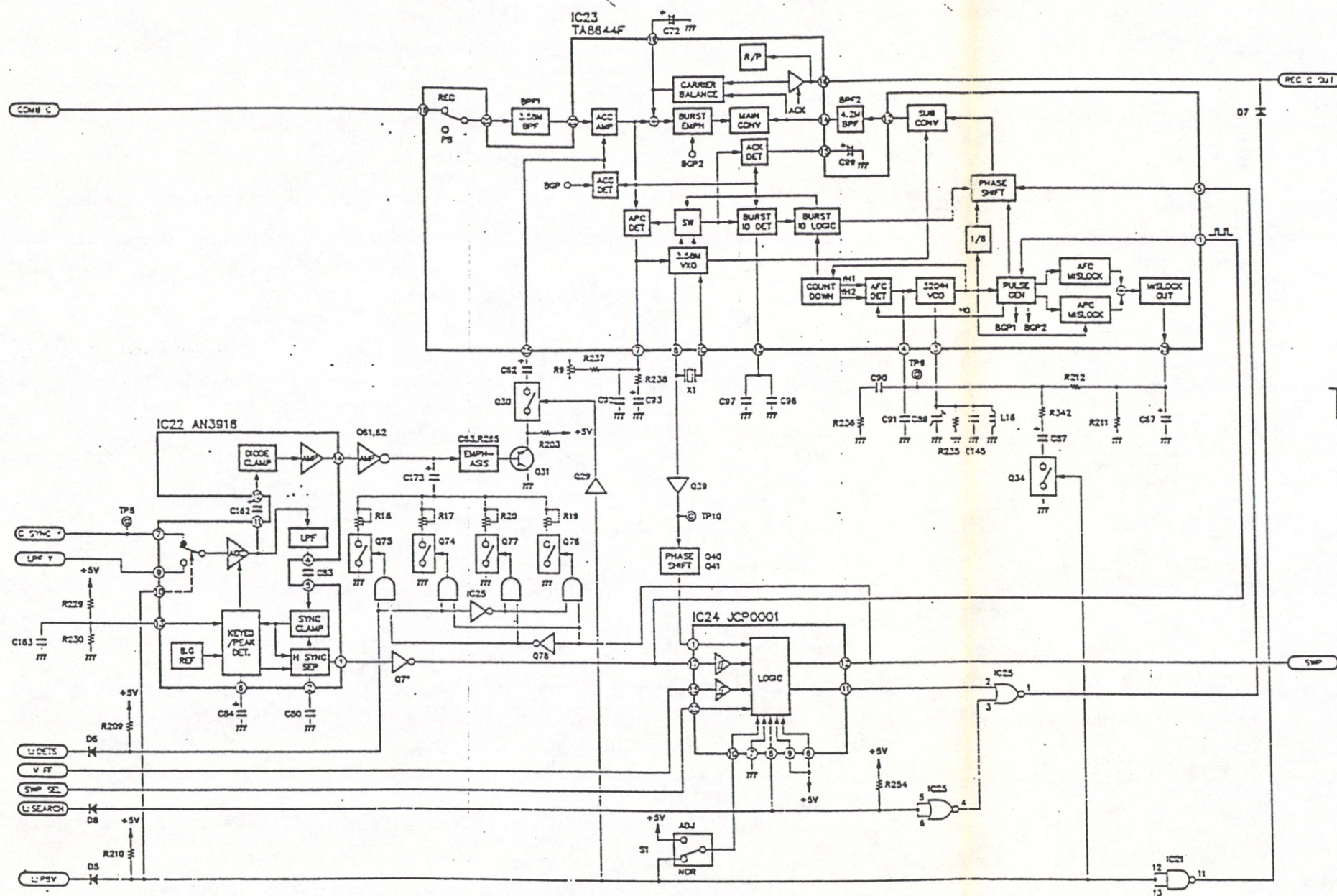
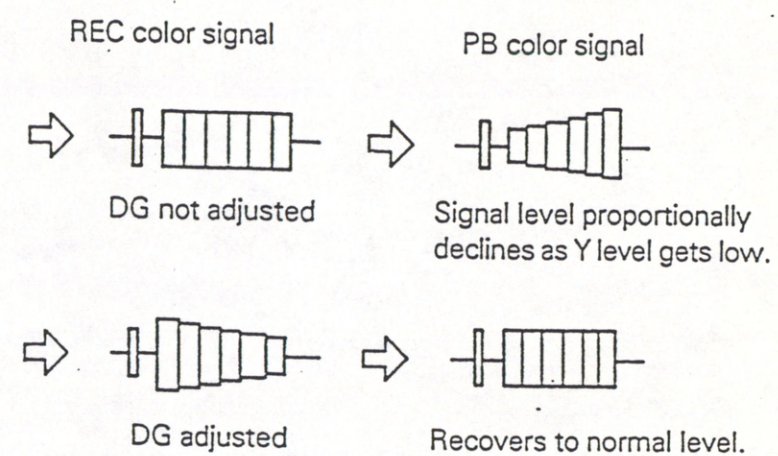
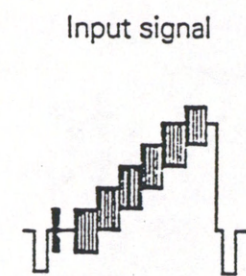
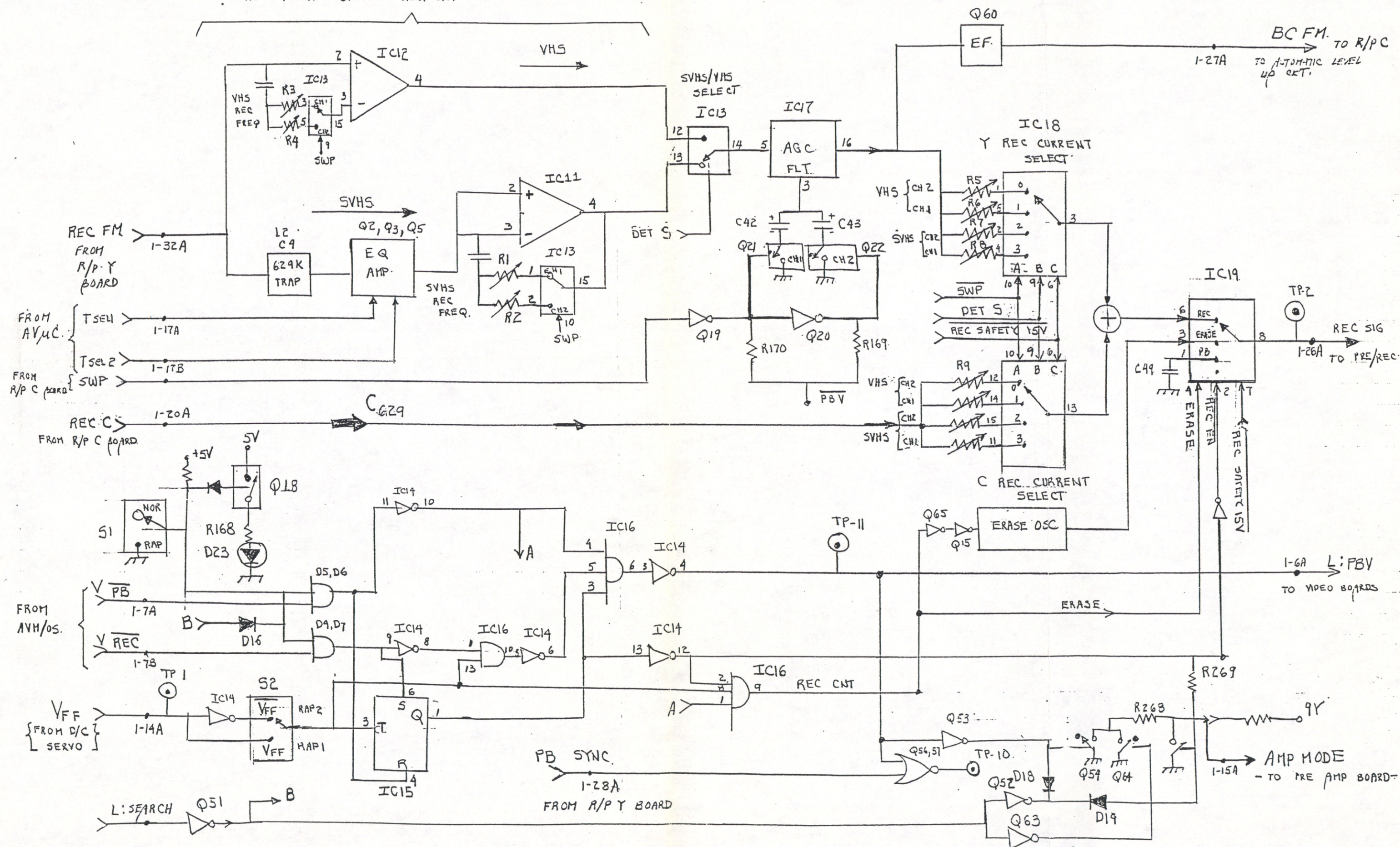


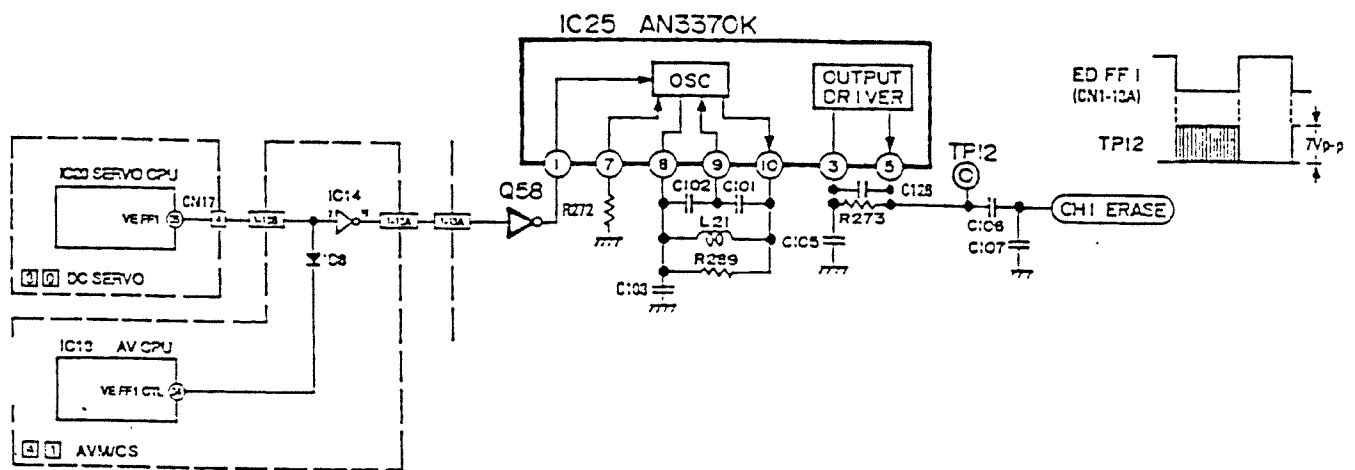
Fig. 6-12-2 REC color signal processing circuit



REC FREQ. RESPONSE ADJ. CKT.



Flying Erase Oscillators



ON R/P ADJ BOARD

RAP Mode

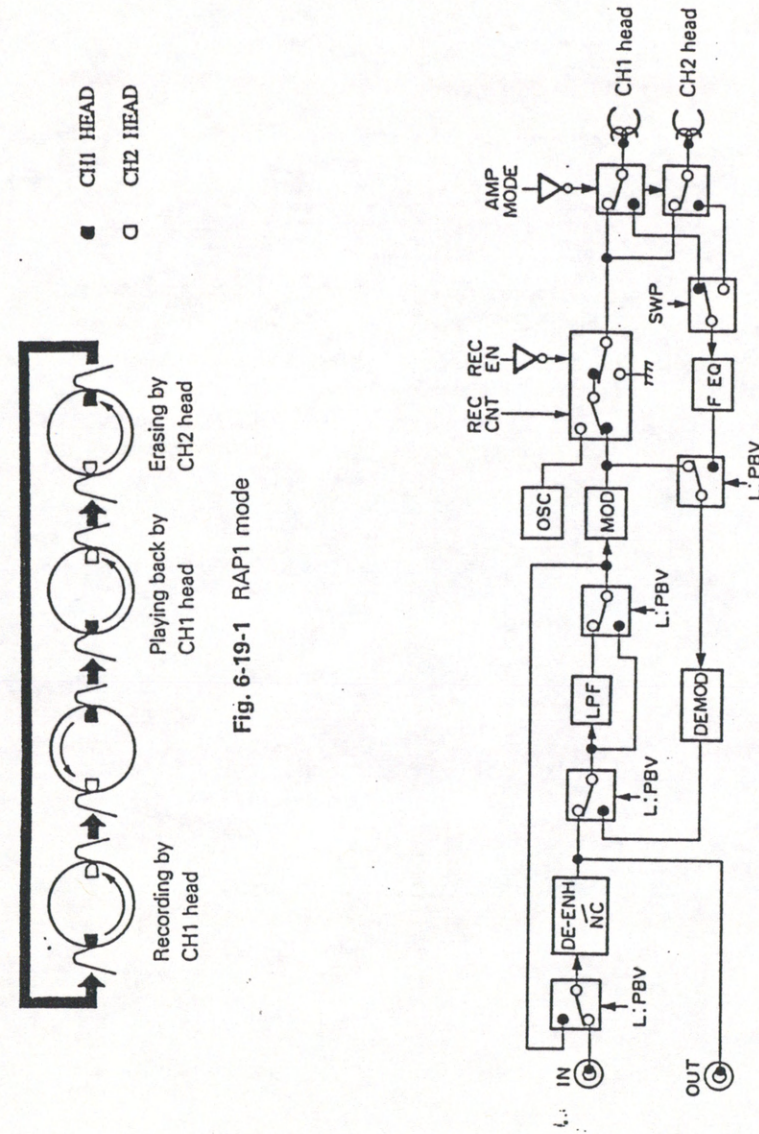


Fig. 6-19-1 RAP1 mode

Fig. 6-19-2 Luminance signal processing circuit

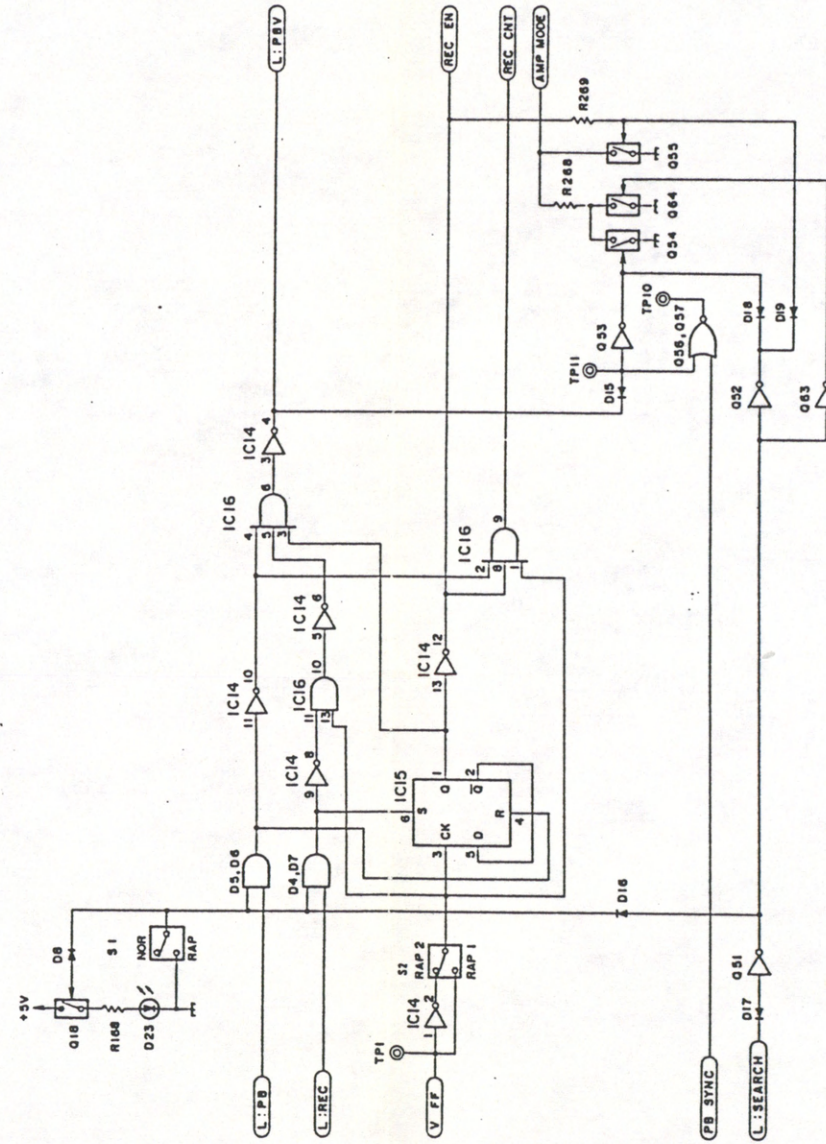


Fig. 6-19-3 RAP mode control signal generator circuit

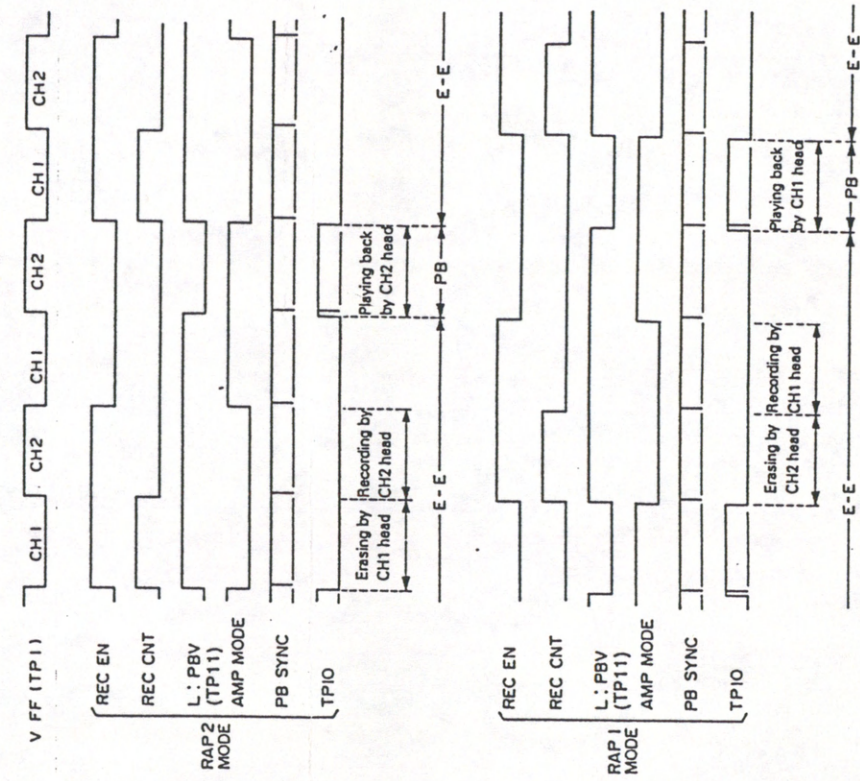
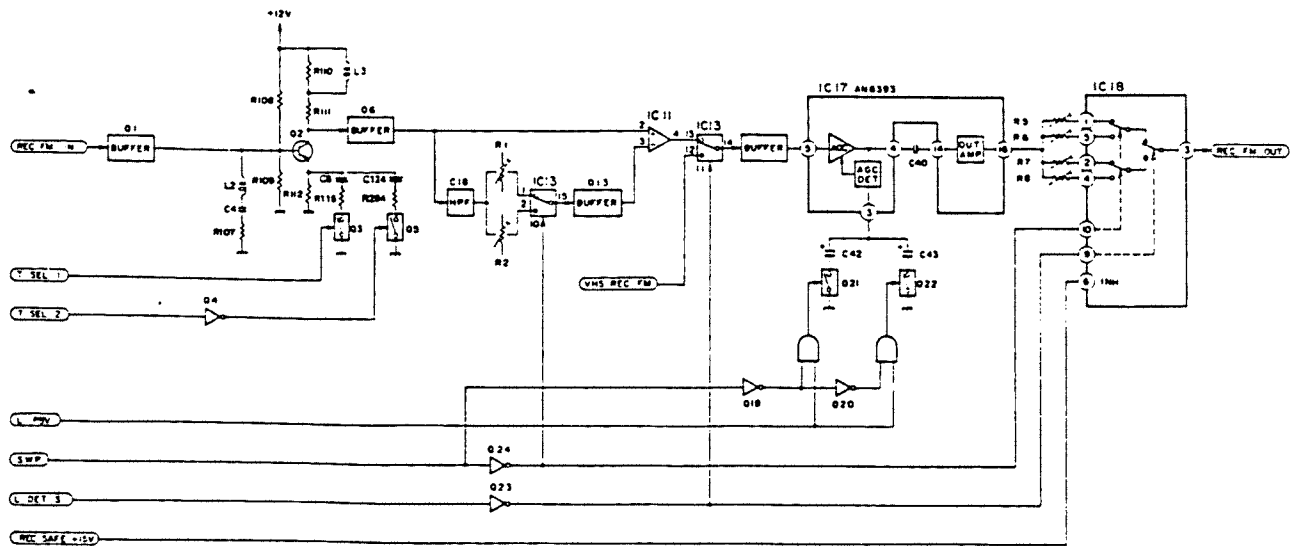


Fig. 6-19-4 RAP mode timing chart

REC Frequency Response Adjusting Circuit



6-6

Position	T SEL1	T SEL2	Q3	Q5	3 MHz level
TYPE 1	L	H	OFF	OFF	+1 dB
TYPE 2	H	H	ON	OFF	0 dB
TYPE 3	L	L	OFF	ON	-1 dB
TYPE 4	H	L	ON	ON	-2 dB

Table 6-6-1 Tape select control signals

6.7 PB RF EQUALIZER CIRCUIT

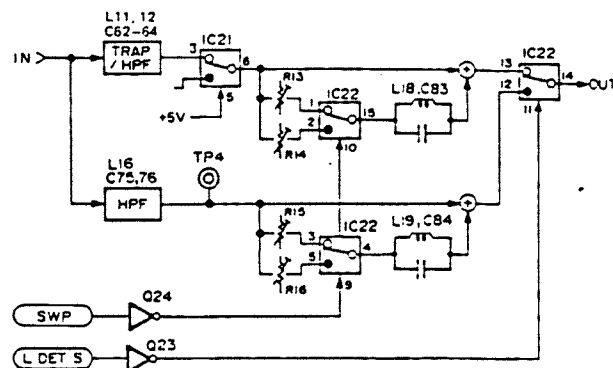
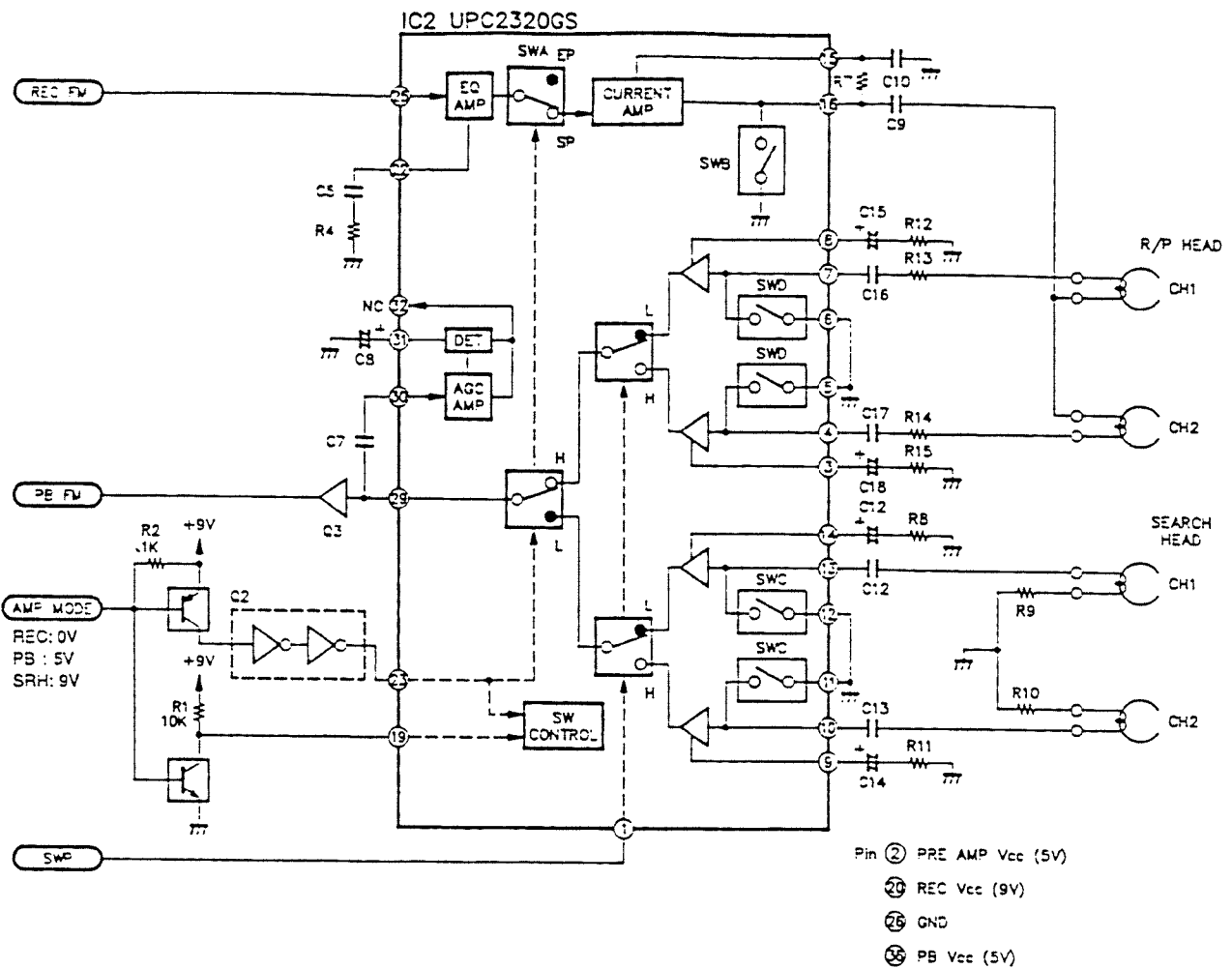


Fig. 6-7-1 RF equalizer circuit (R/P ADJ board)



Pre/Rec Amplifier Circuit

	AMP MODE	NOR/SRH Pin ②③	REC/PB Pin ①⑨	SW A	SW B	SW C	SW D
REC	L	H	H	SP	OFF	ON	ON
PB	M	H	L	—	ON	ON	OFF
SEARCH	H	L	L	—	ON	OFF	OFF

Table 6-20-1 Switching mode

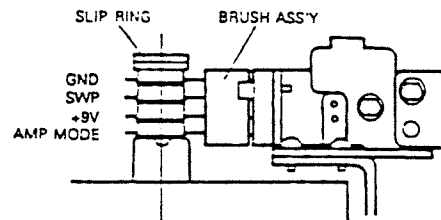
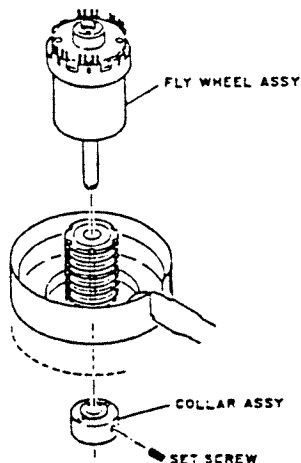
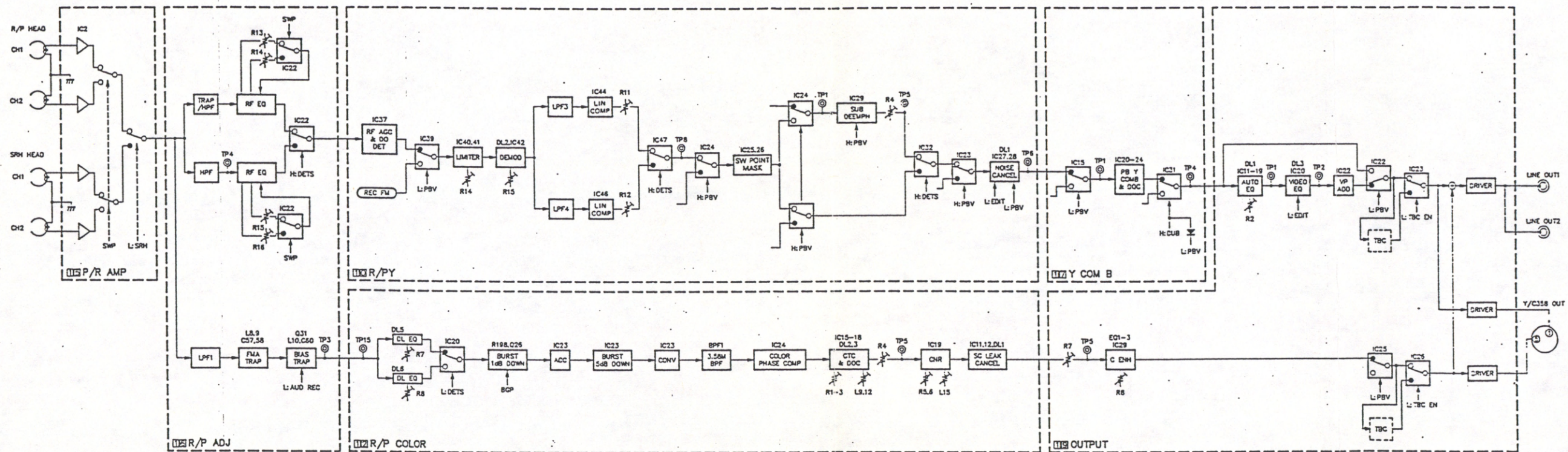
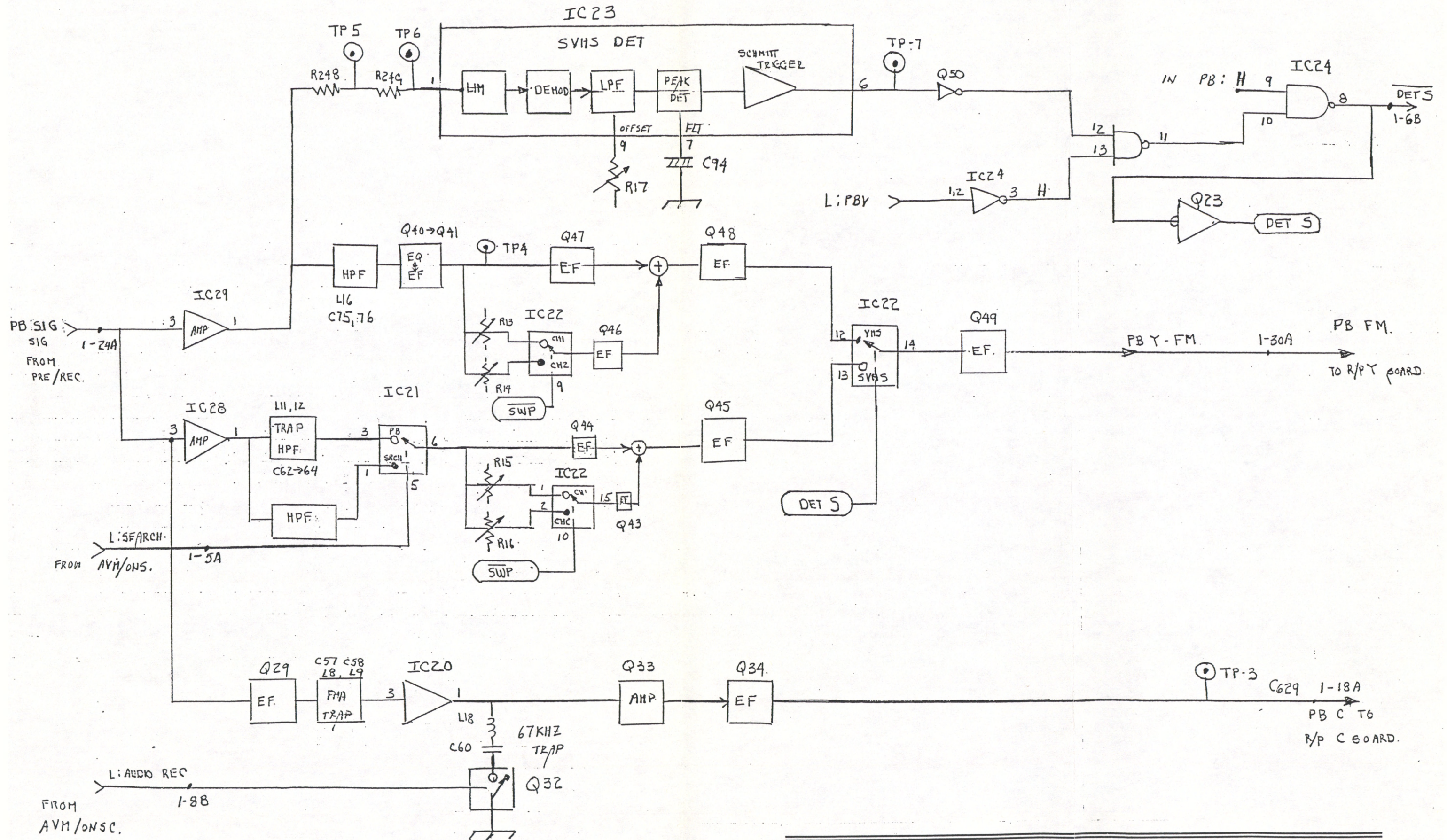


Fig. 6-20-3 Signal transmission of brush assembly

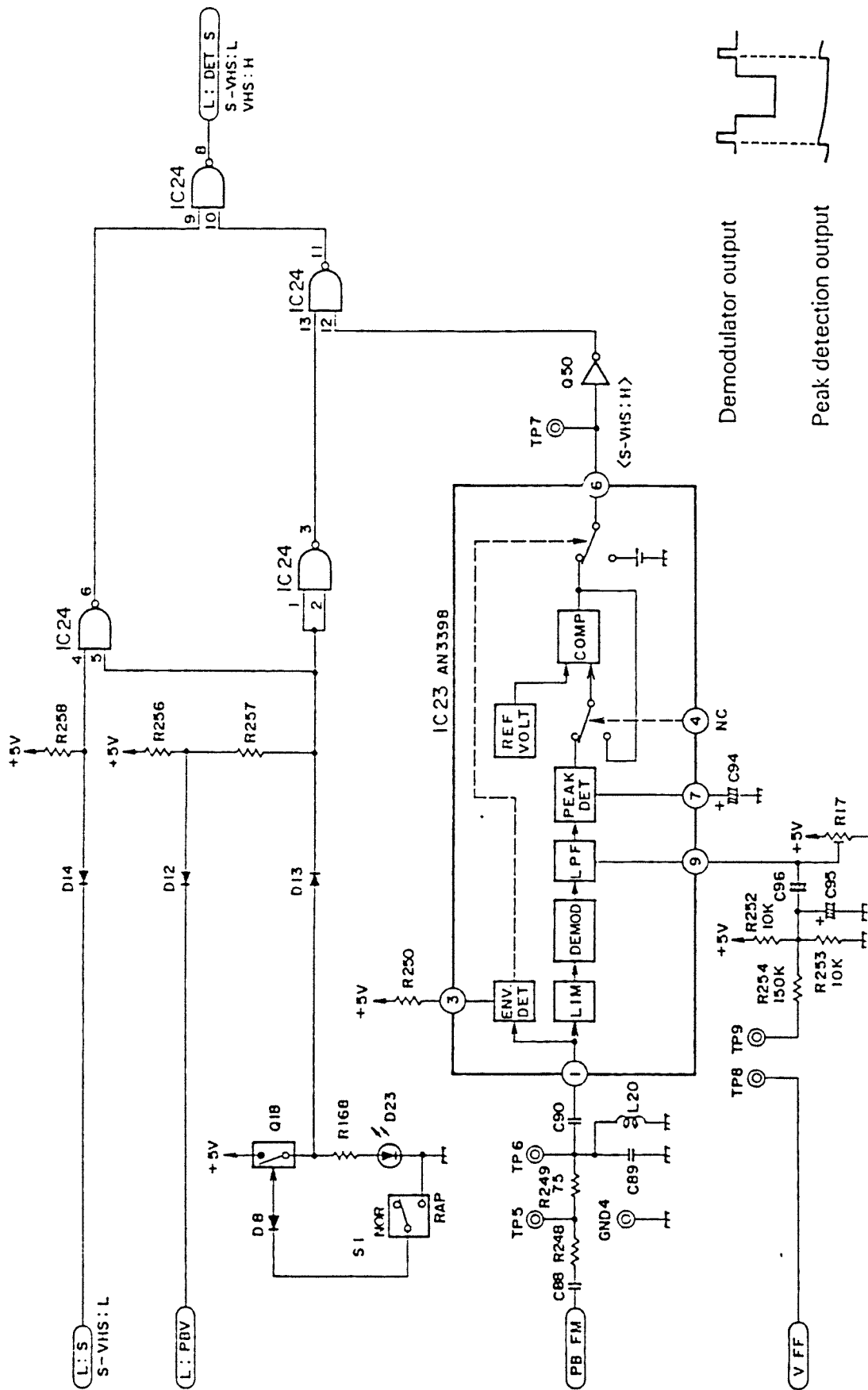
Video Signal Block Diagram in Playback Mode



Record Mode - R/P Adjust Block Diagram

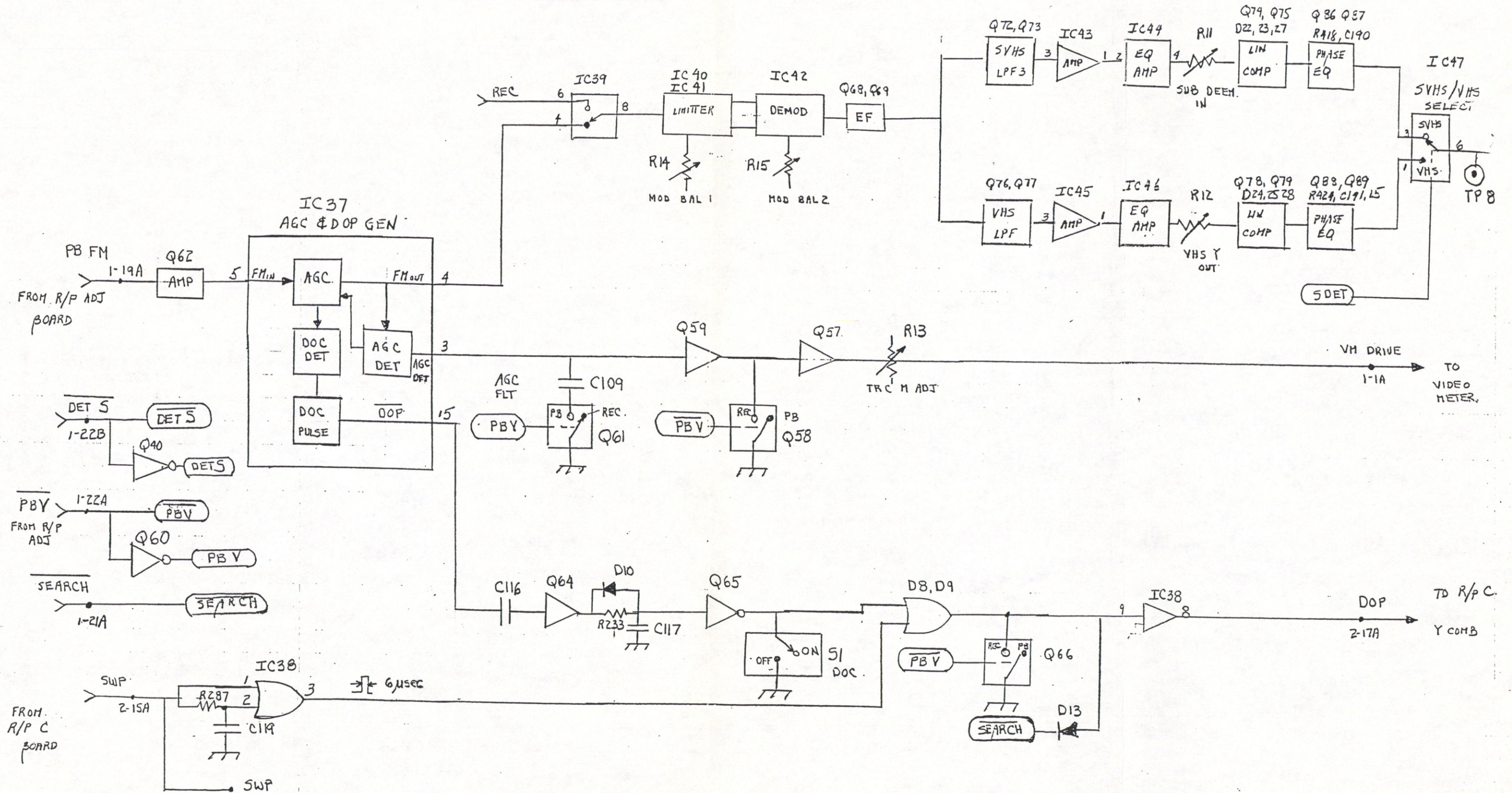


6.23 S-VHS MODE DETECTION CIRCUIT



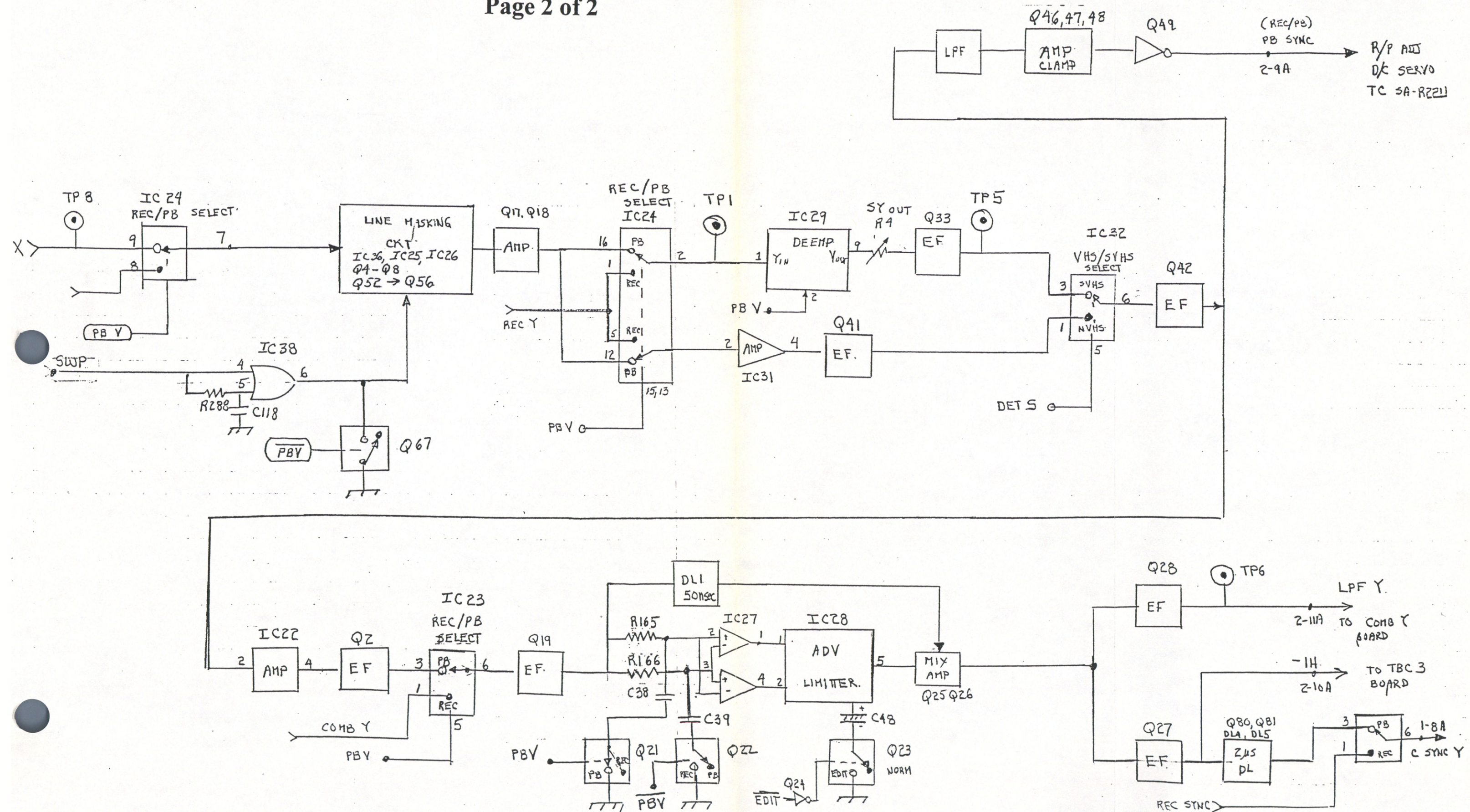
Playback Mode - R/P Y Block Diagram

Page 1 of 2



Playback Mode - R/P Y Bock Diagram

Page 2 of 2



DOP Generating Circuit

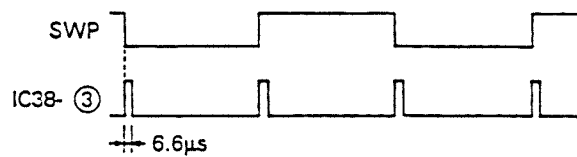
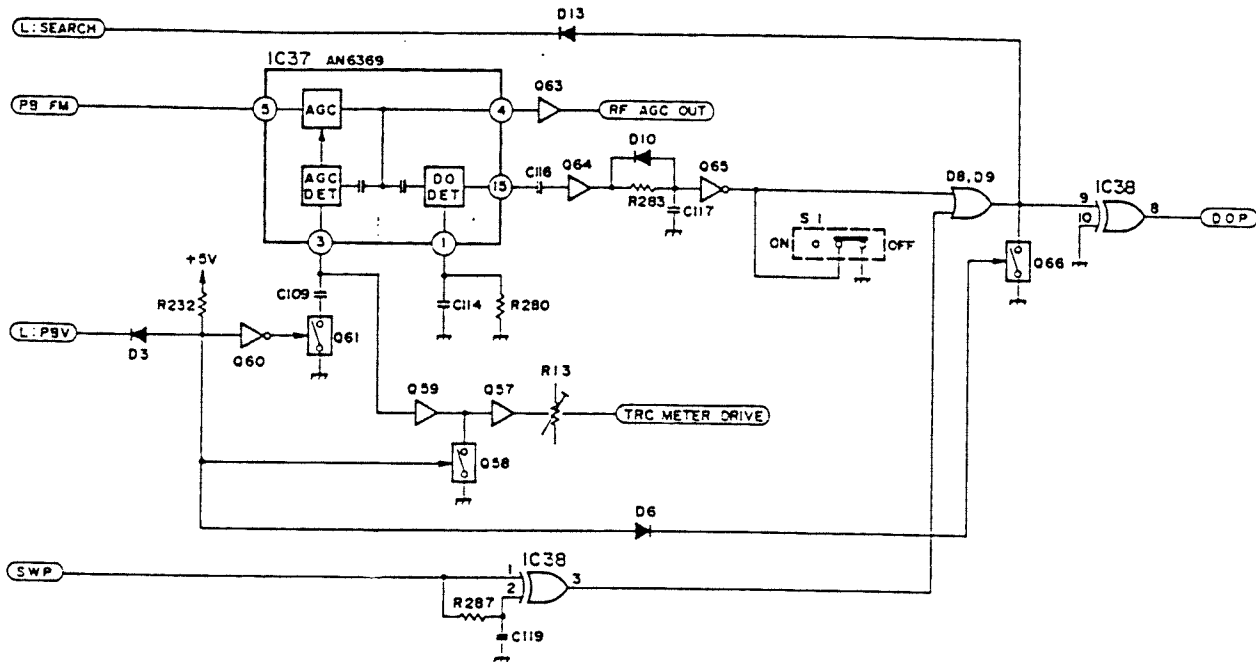
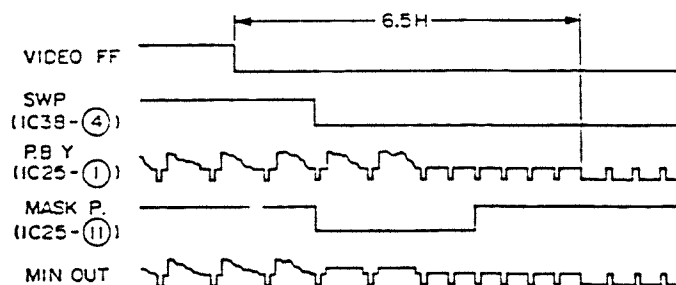
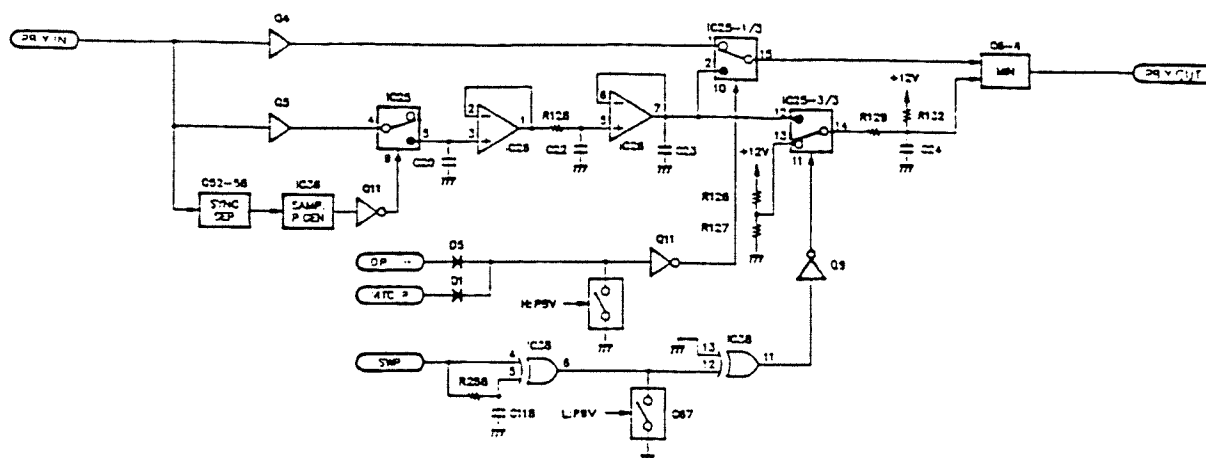


Fig. 6-4-3 SWP edge pulse

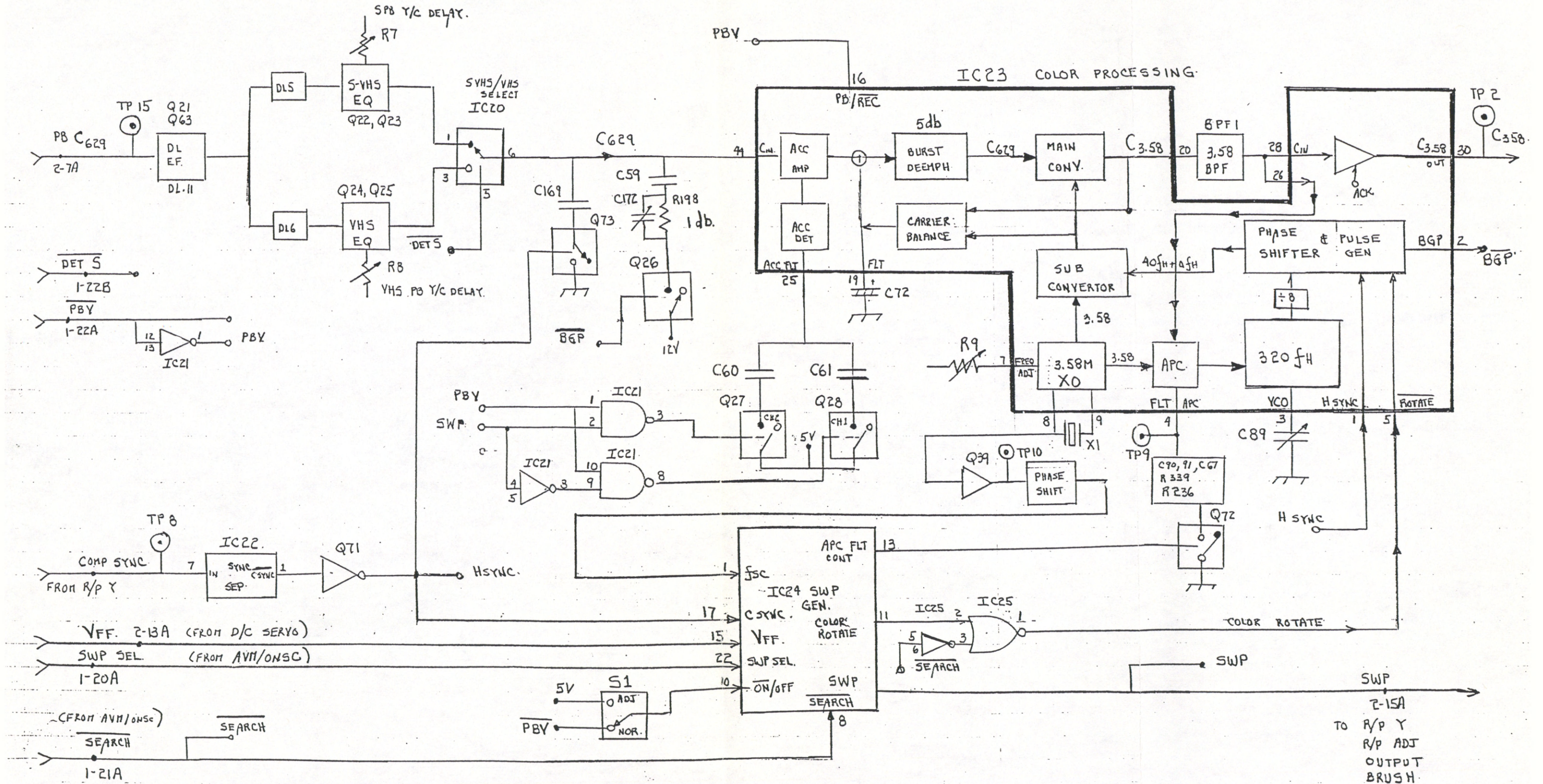
PB Switching Point Masking Circuit



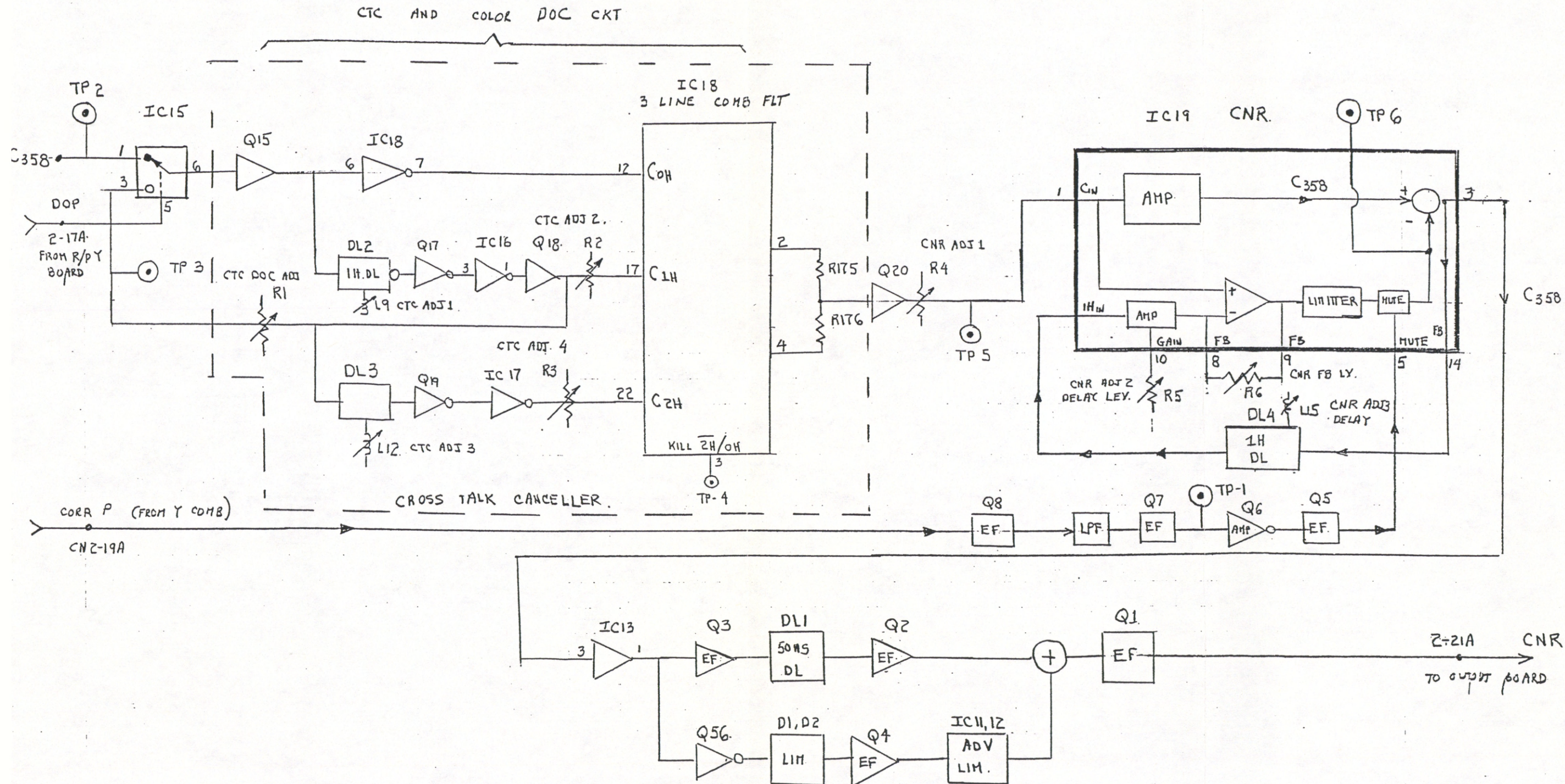
Note: Delay time of SWP depends on setting of the memory switch No. 100.

Masking Pulse timing diagram

Playback Mode - R/P C Block Diagram Page 1 of 2



Playback Mode - R/P C Block Diagram Page 2 of 2



PB Switching Point Delay Circuit

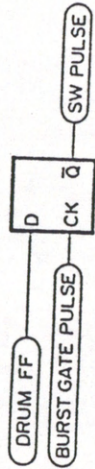


Fig. 6-18-1 SW noise fixing circuit in BR-S811

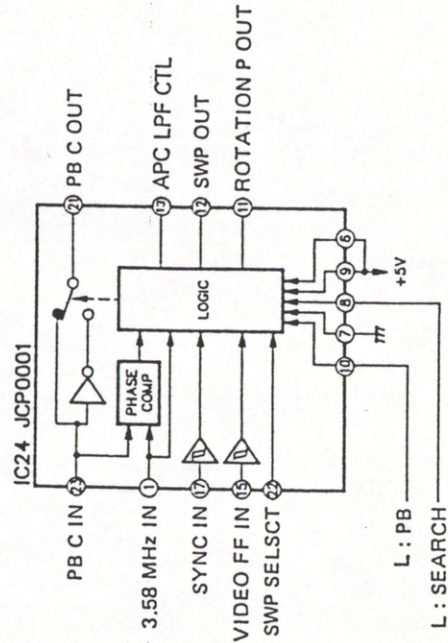


Fig. 6-18-3 IC24 block diagram

MODE	MENU No. 100	PIN (22) SWP SEL	PIN (10) H: FUNCTION OFF	PIN (8) L: SRH	PIN (15) V FF	PIN (11) ROT CTL	PIN (12) SWP
REC	REC 6.5H, PB 4.5H	L	H	H	DRUM FF	DRUM FF	DRUM FF
	REC 6.5H, PB 5.5H	H					
	REC 2.25H, PB 1.25H	H					
PB	REC 6.5H, PB 4.5H	L	L	H	DRUM FF	4.0/4.5H	←
	REC 6.5H, PB 5.5H	H				6.0/5.5H	←
	REC 2.25H, PB 1.25H	H				2.0H	←
TRICK	REC 6.5H, PB 4.5H	L	L	L	SEARCH FF	SEARCH FF	←
	REC 6.5H, PB 5.5H	H					
	REC 2.25H, PB 1.25H	H					

Note: In this model, SEARCH FF signal is not used as ROTATION CTL signal since only CH2 track is played back in the special playback mode. Level at pin(5) of IC23 is forcibly set to "L" (CH2) by IC25.

Table 6-18-1 Delay time of switching point

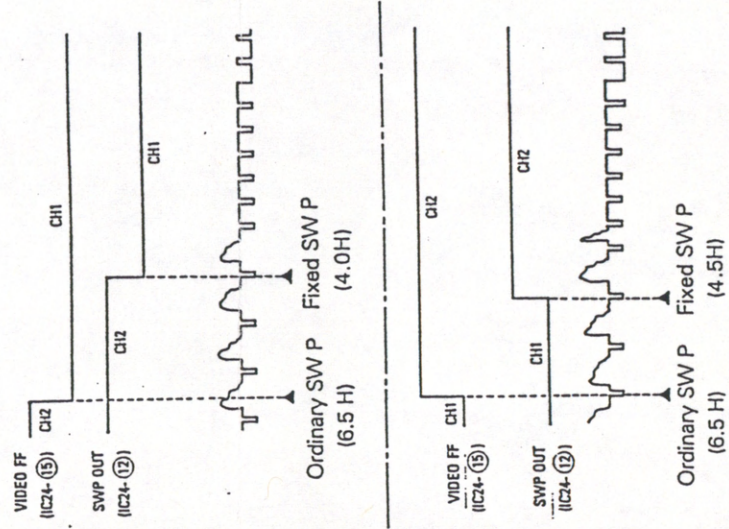


Fig. 6-18-2 Shift of switching point (in playback)

CNR Circuit

6.15 CNR CIRCUIT

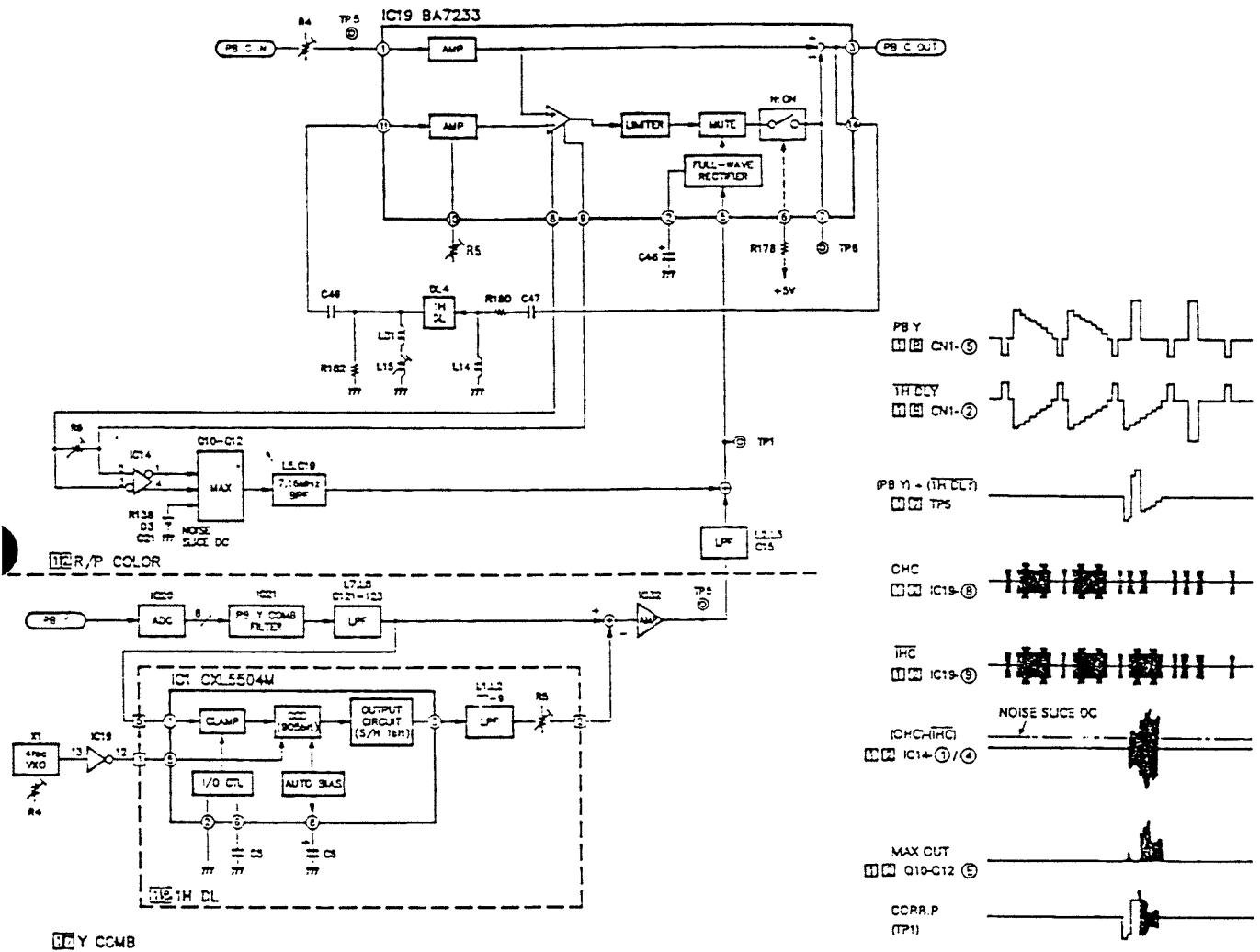
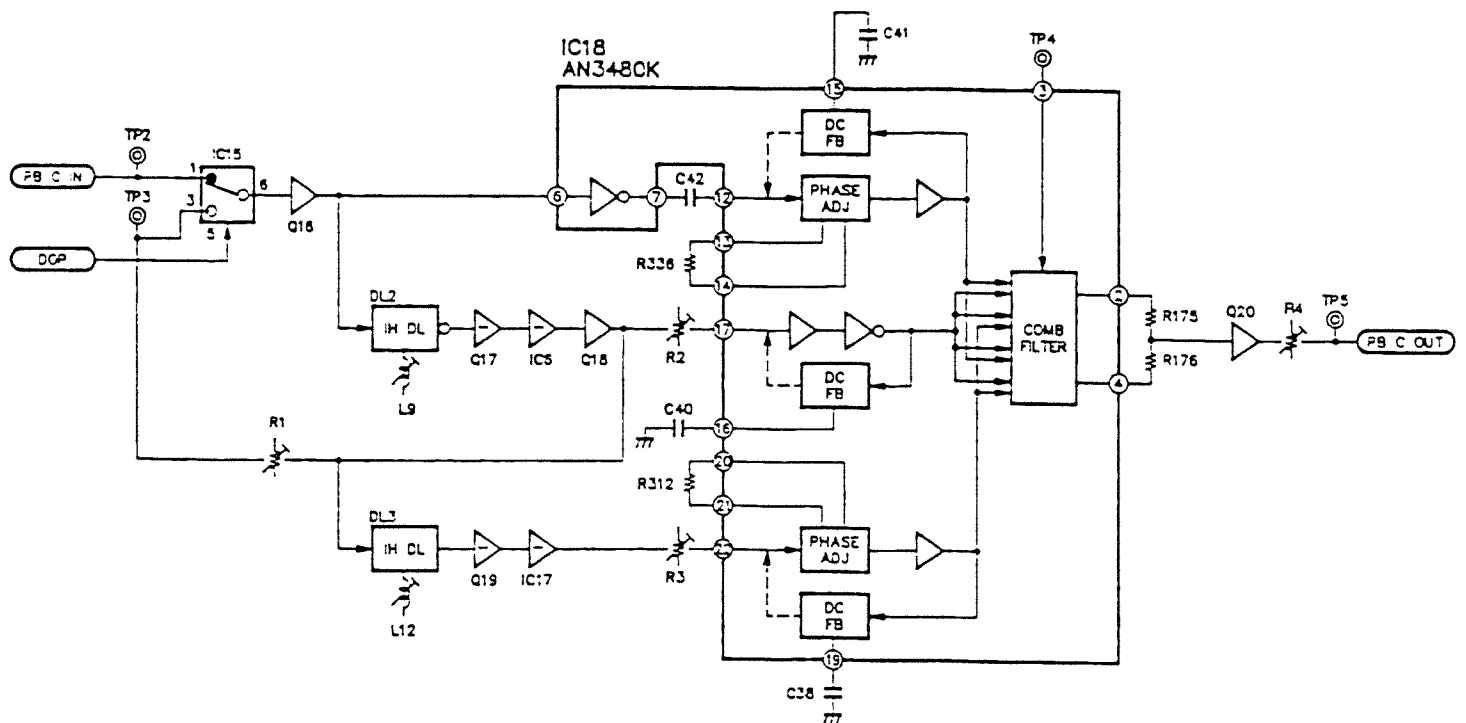


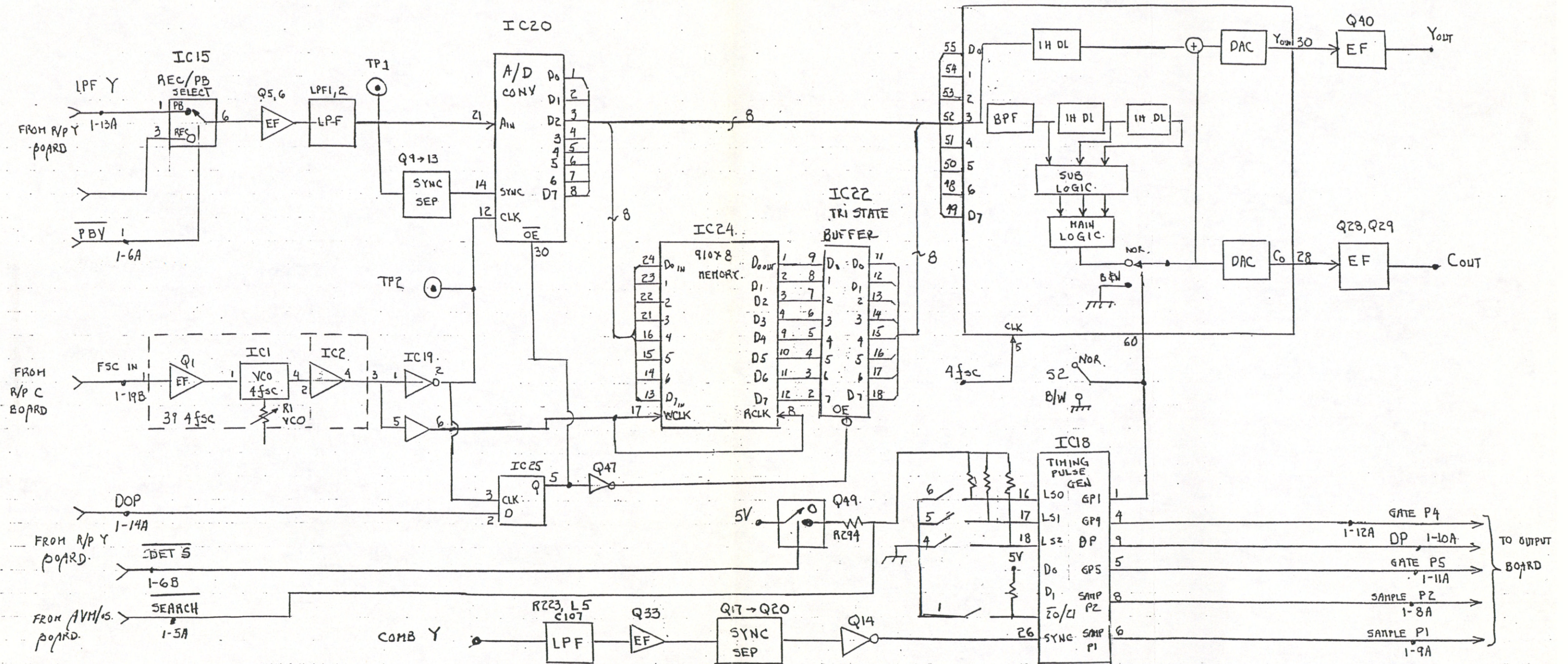
Fig. 6-15-1 CNR circuit

Crosstalk Canceller/Color DOC Circuit

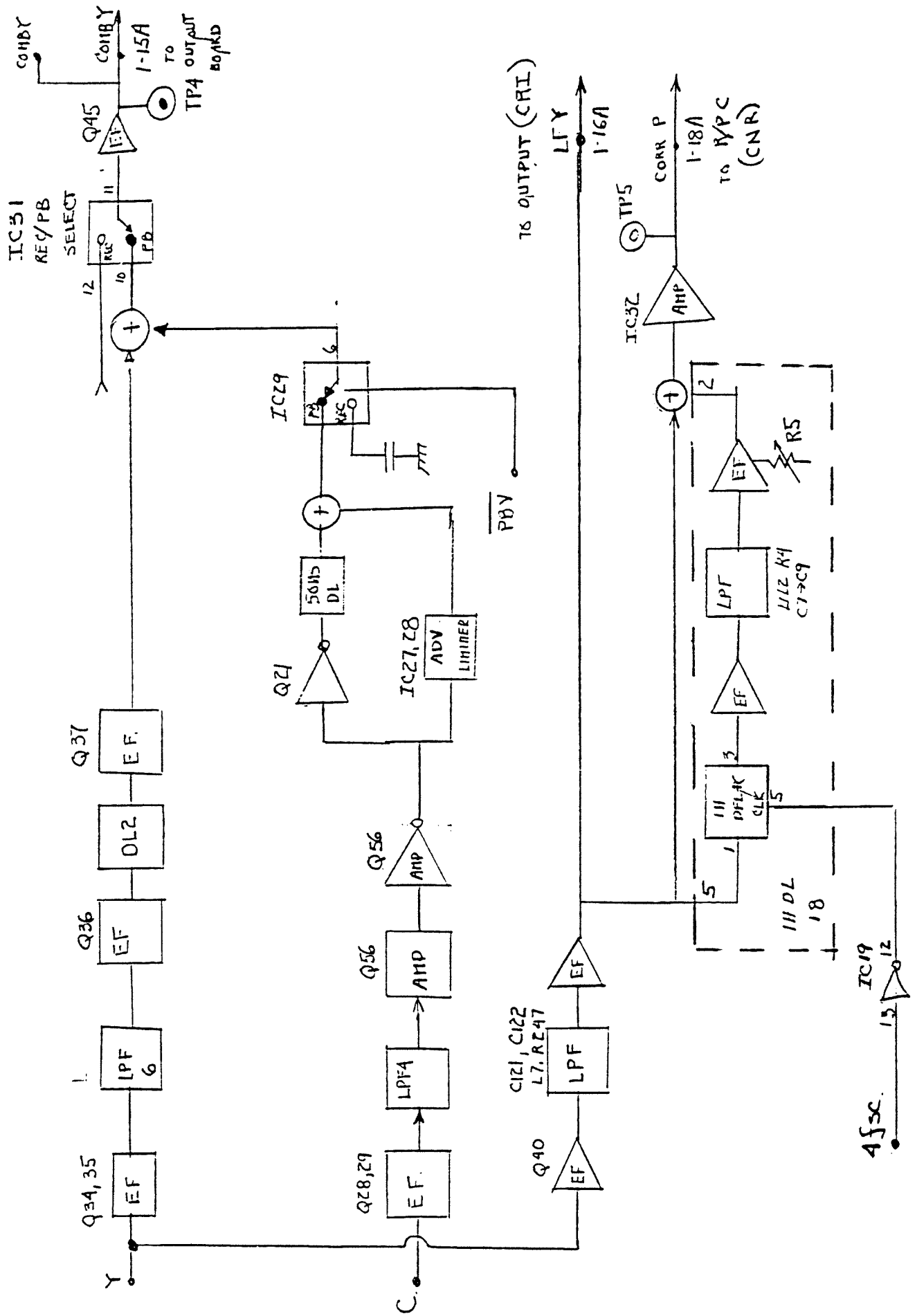


Playback Mode - Y Comb and DOC Block Diagram

Page 1 of 2



Playback Mode - Y Comb and DOC Block Diagram Page 2 of 2



6.4.3 Dropout detector circuit

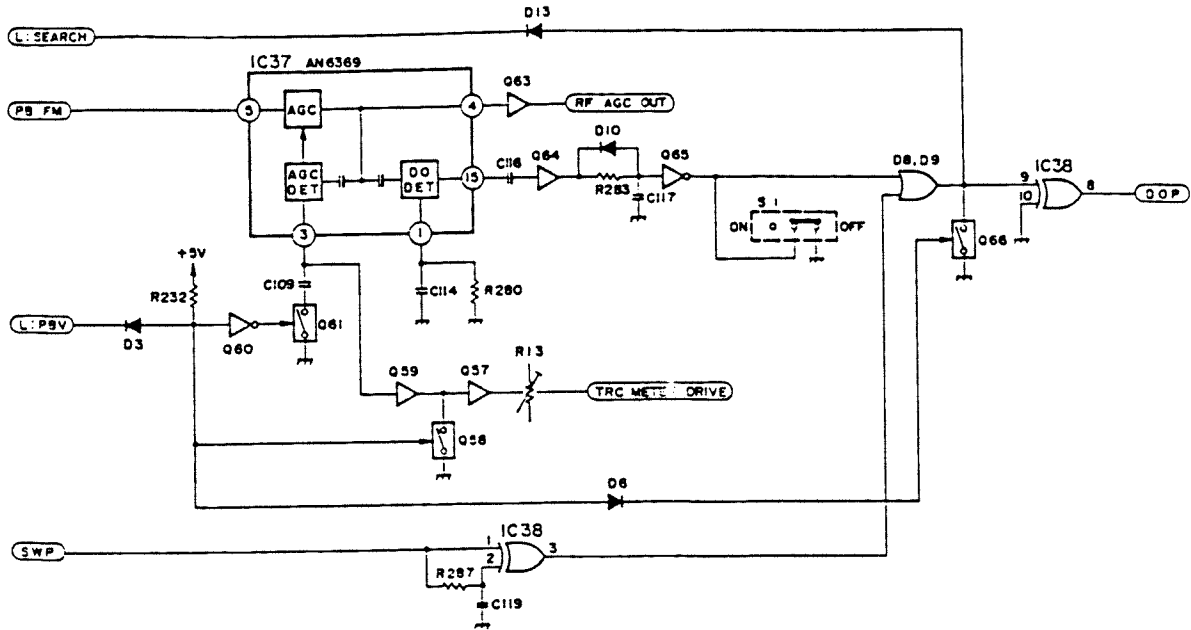


Fig. 6-4-2 Dropout detector circuit (R/P Y board)

6.4.2 Circuit operation

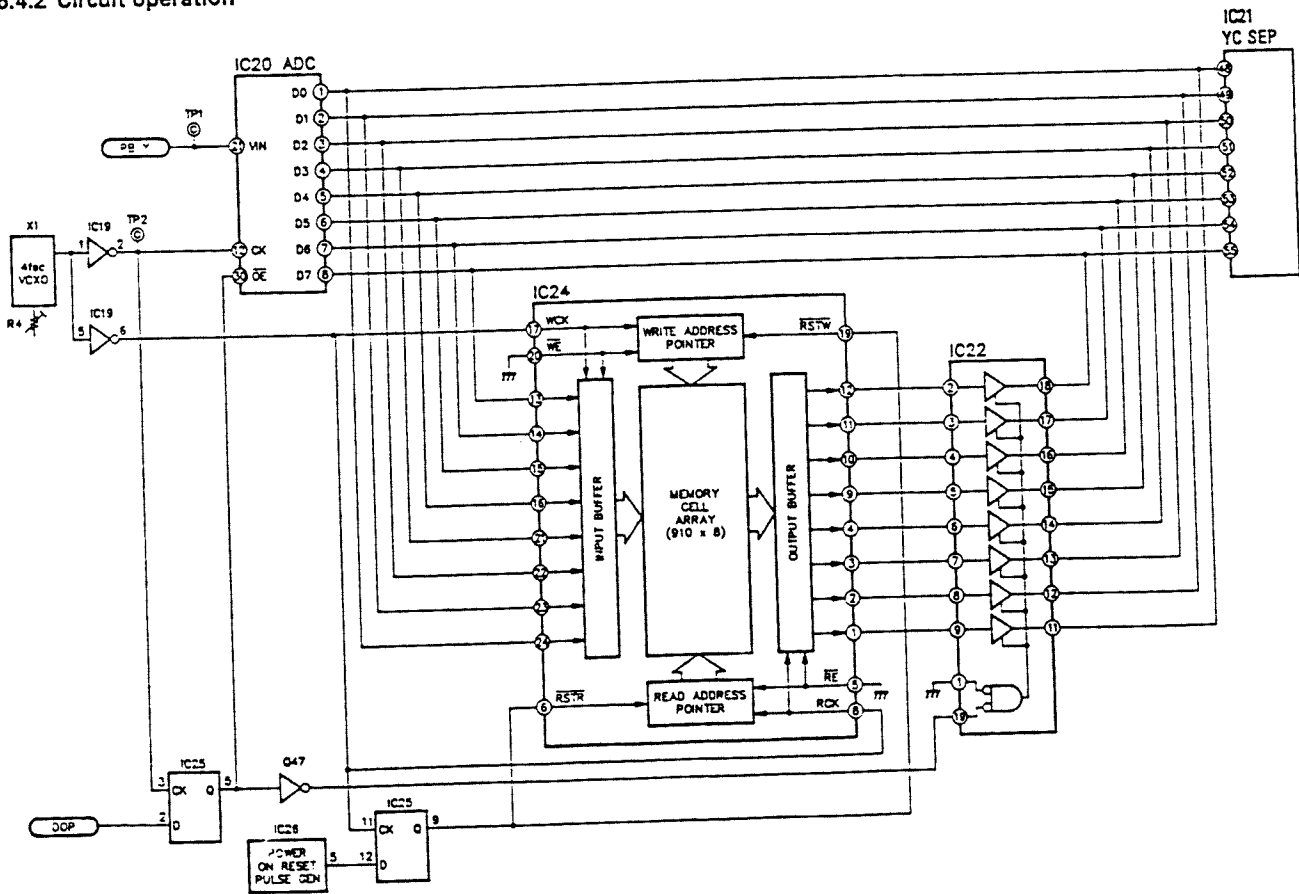
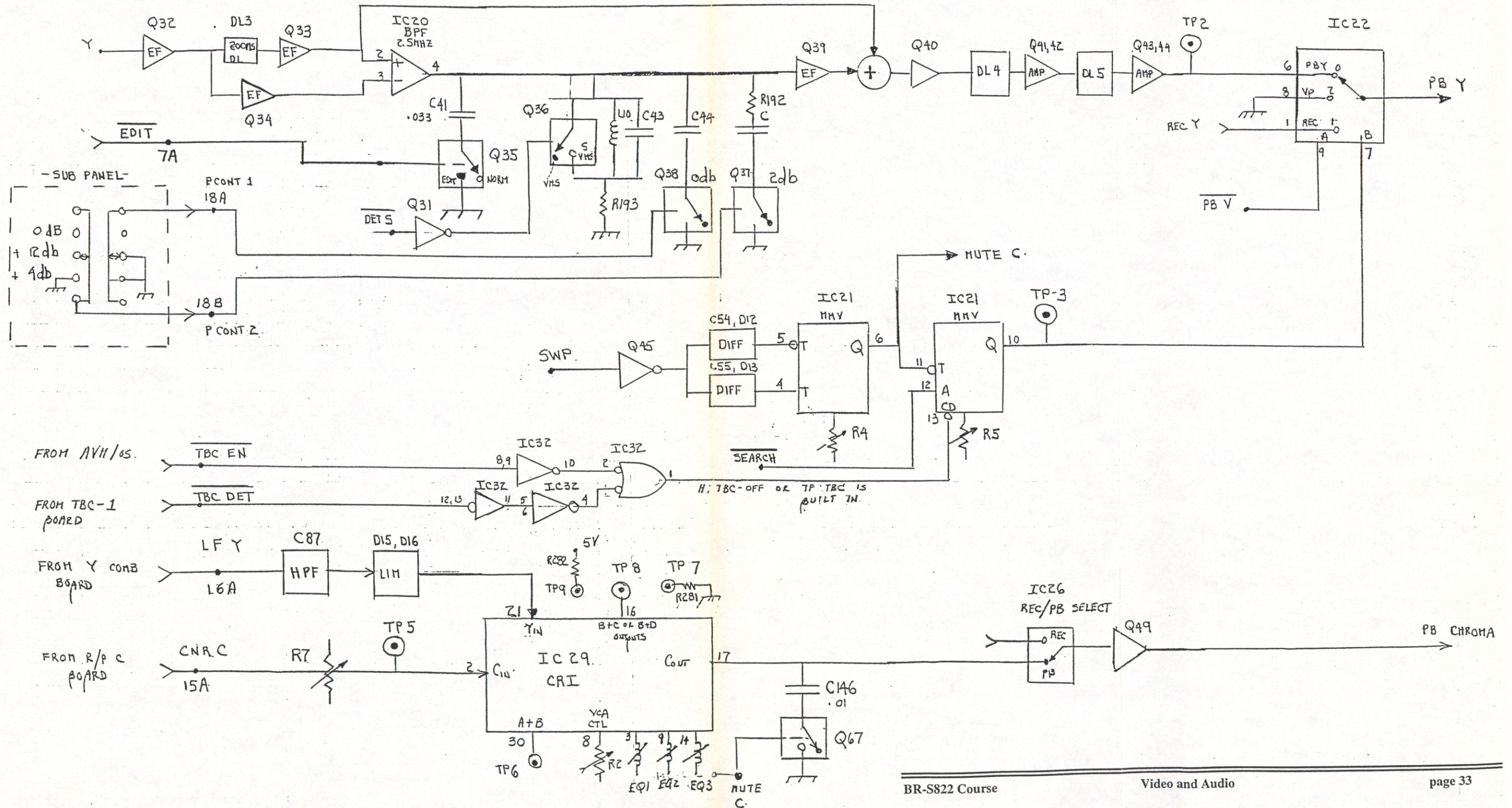


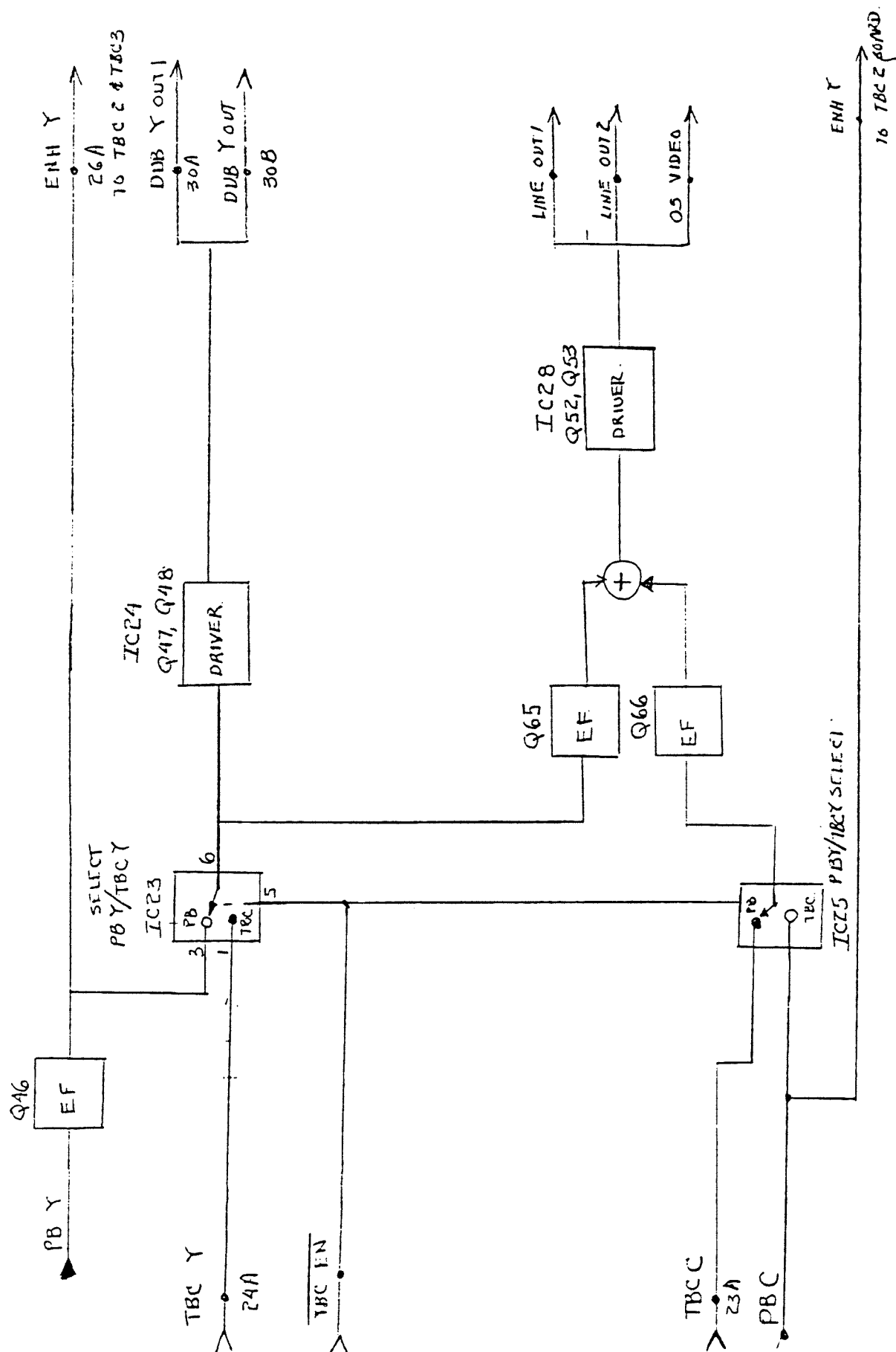
Fig. 6-4-1 Y DOC circuit (Y COMB board)

Playback Mode - Output Block Diagram

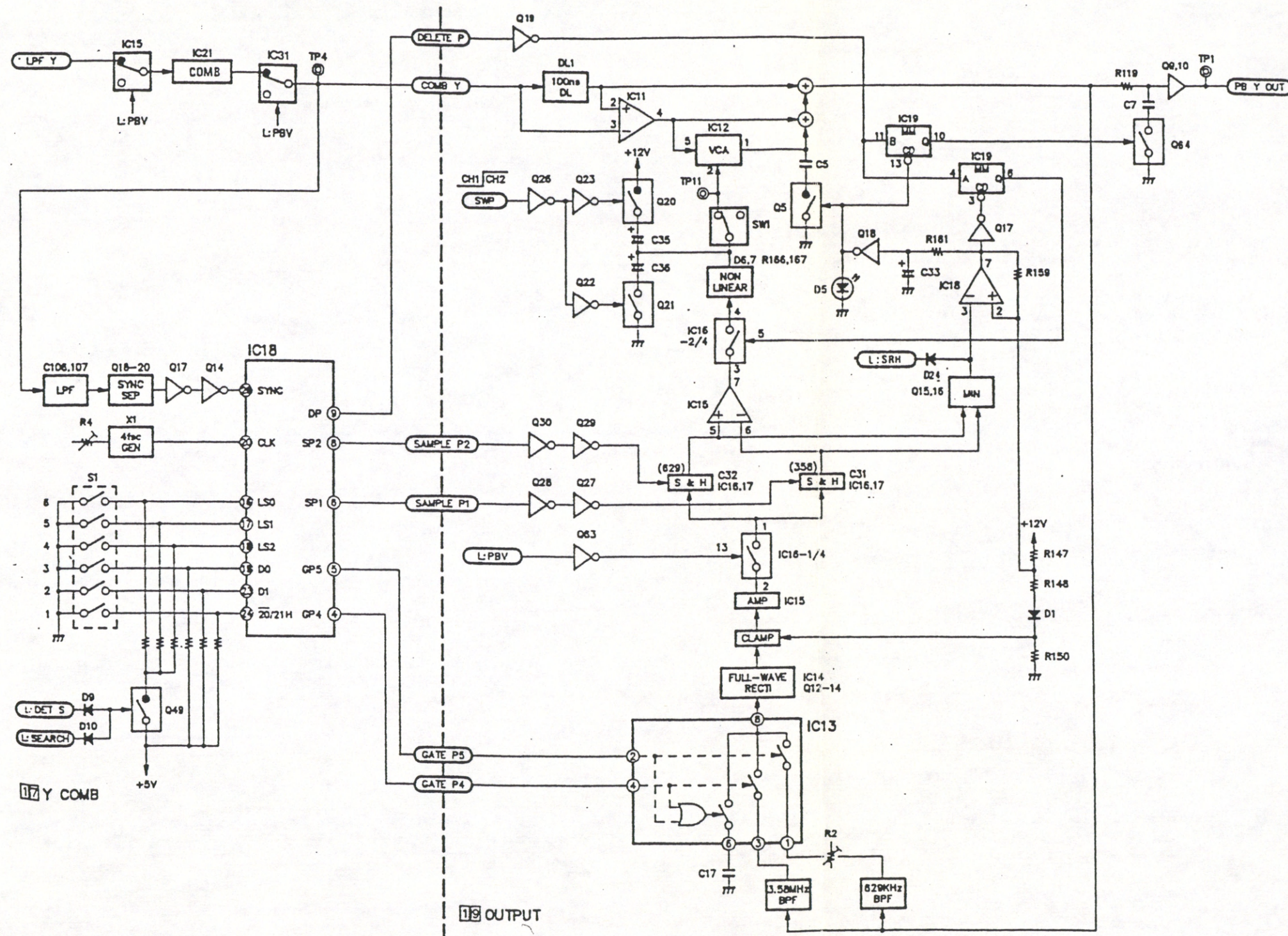
Page 2 of 3



Playback Mode - Output Block Diagram Page 3 of 3



Auto EQ Circuit in PB Mode



PB Y Enhancement Circuit

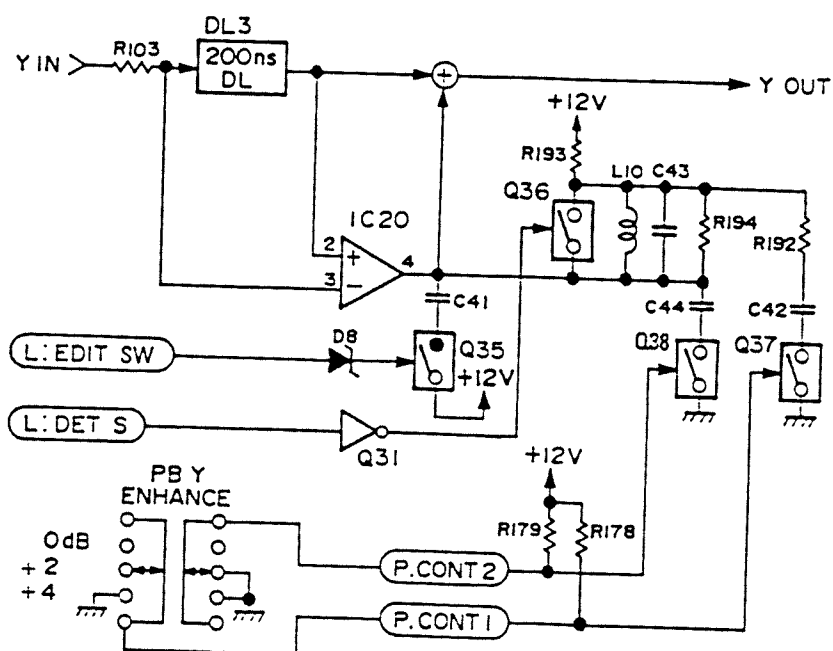


Fig. 6-11-1 Video equalizer circuit (OUTPUT board)

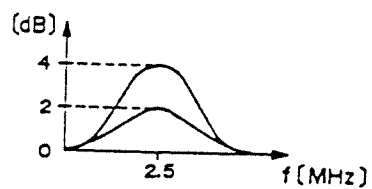


Fig. 6-11-2 S-VHS mode

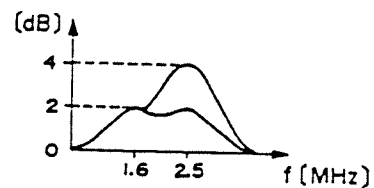


Fig. 6-11-3 VHS mode

Color Edge Enhancer Circuit

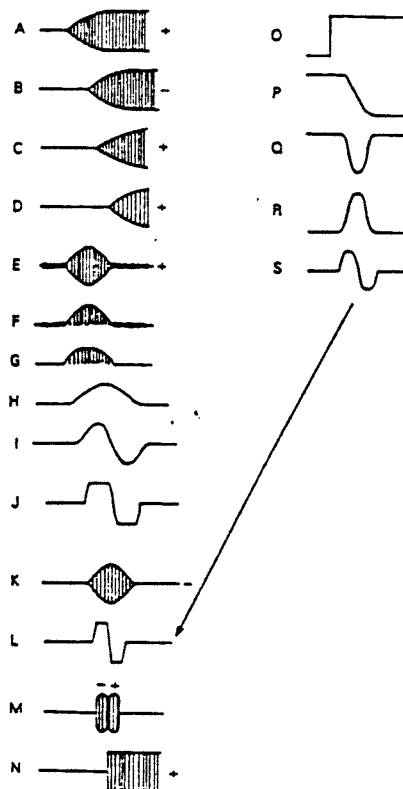
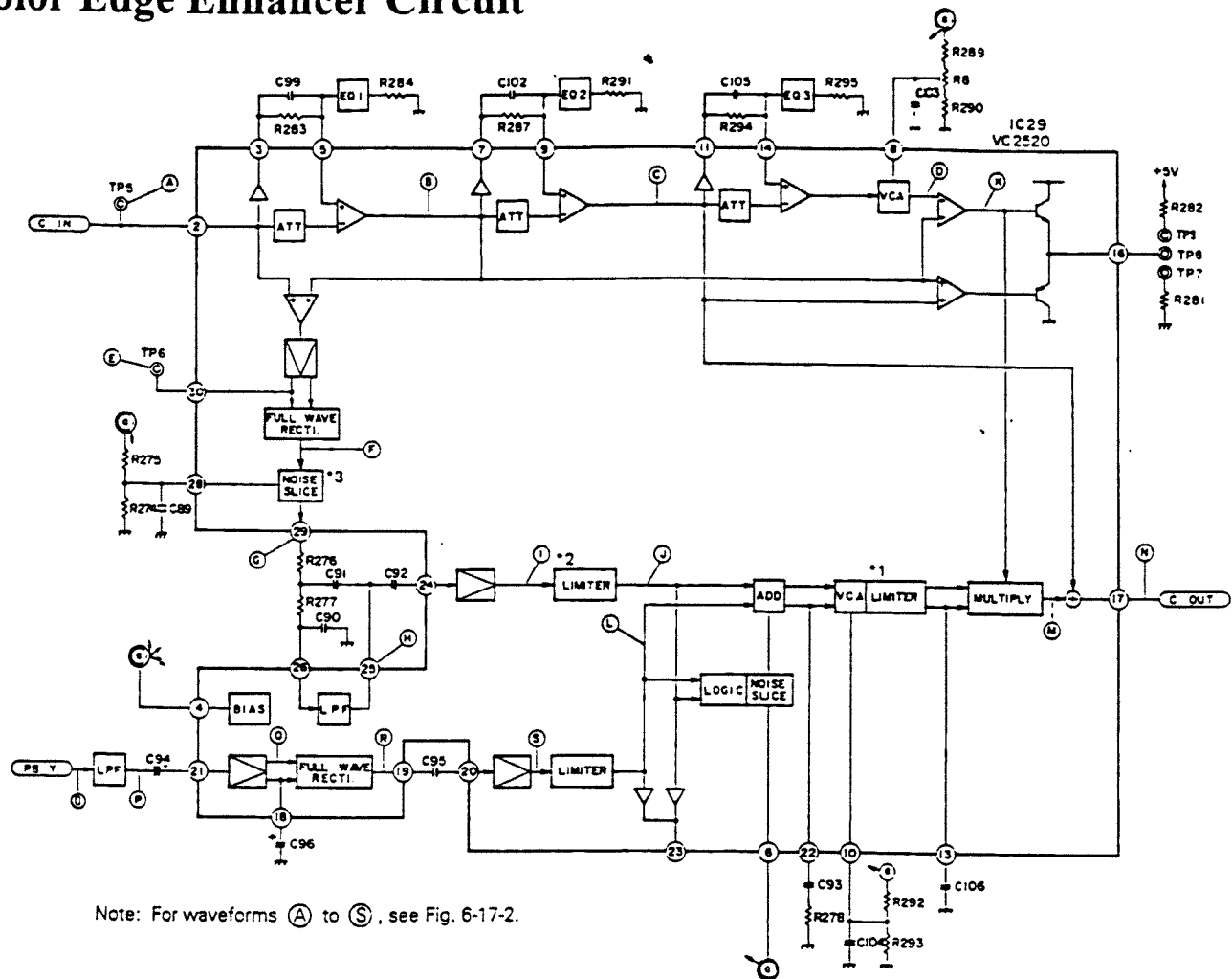


Fig. 6-17-2 Color enhancer circuit timing chart

OnScreen Circuit

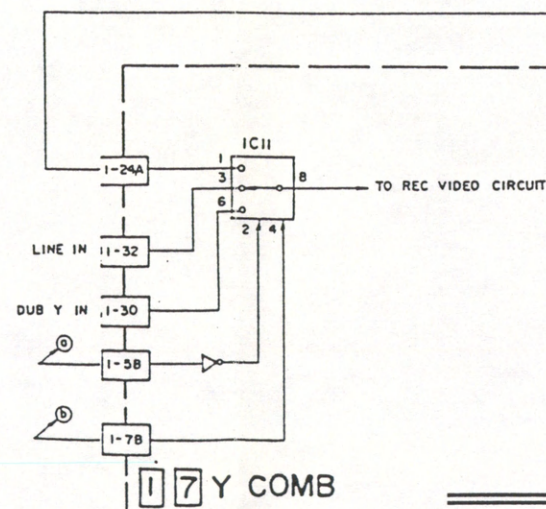
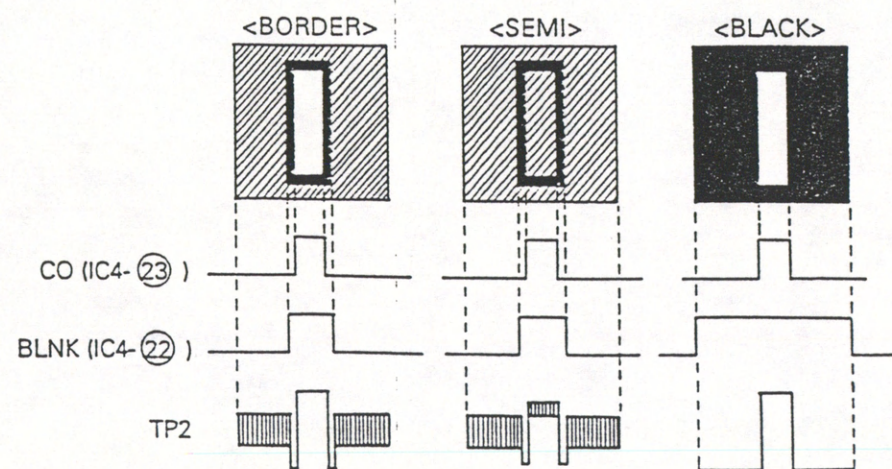
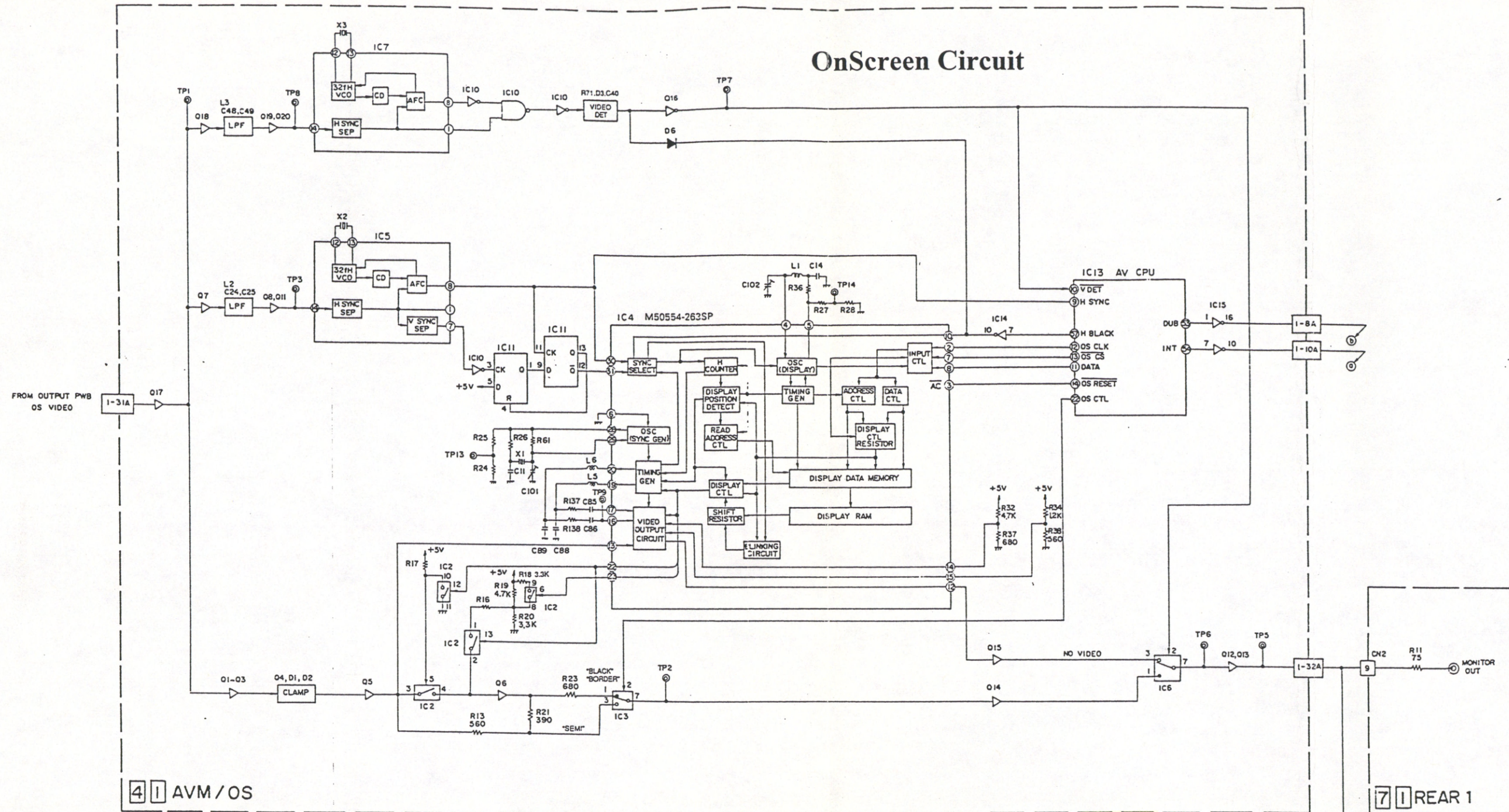
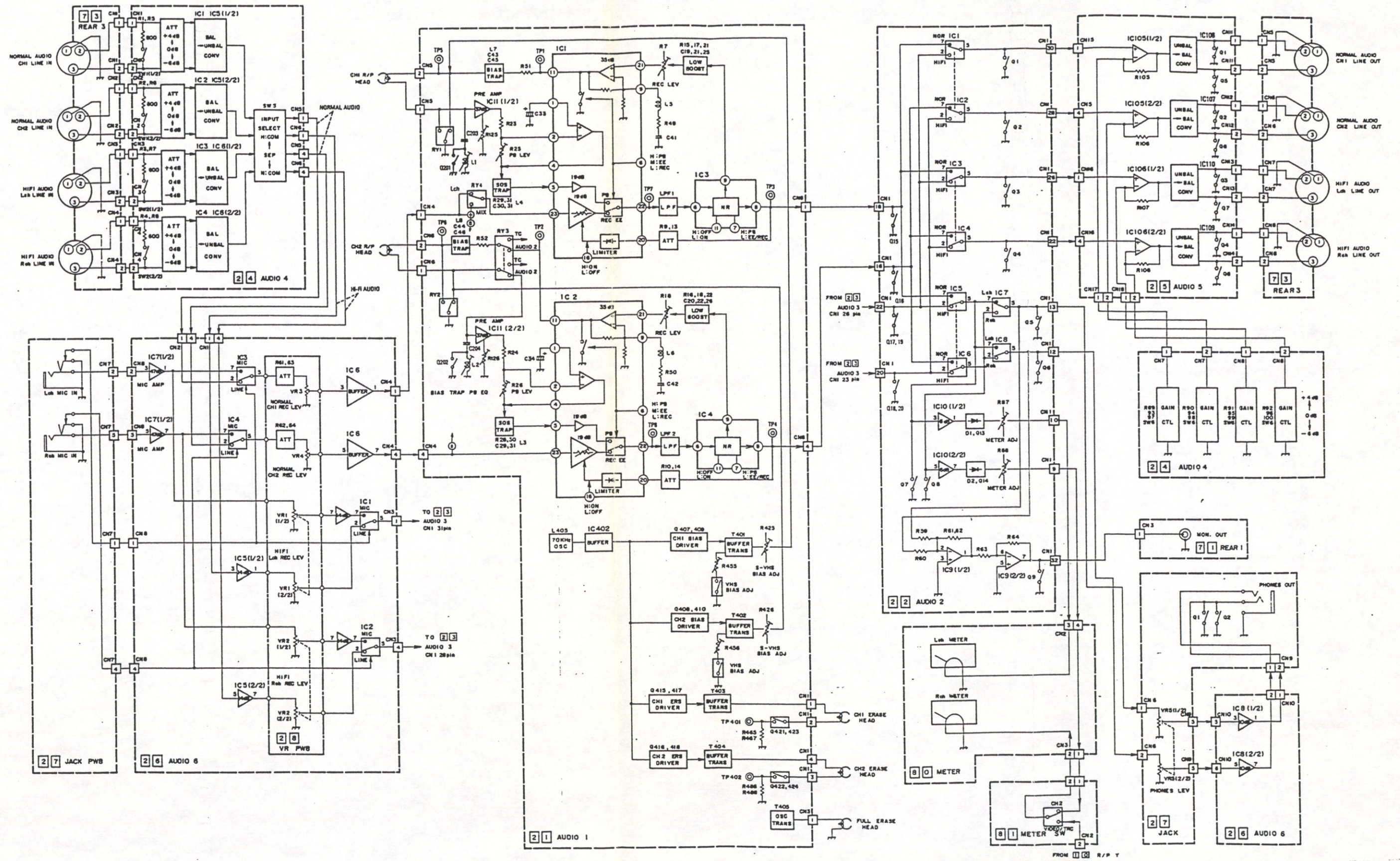


Fig. 3-7-5

Normal Audio Block Diagram



Balanced to unbalanced audio convertor

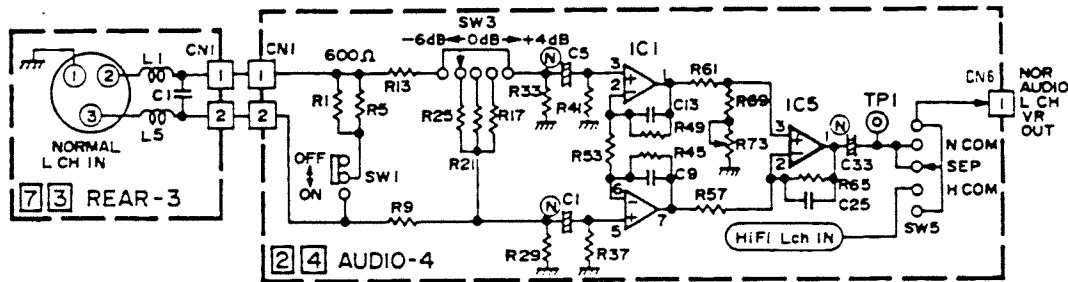
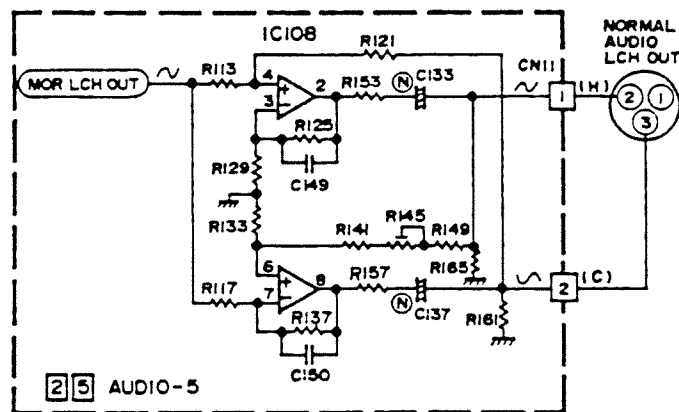
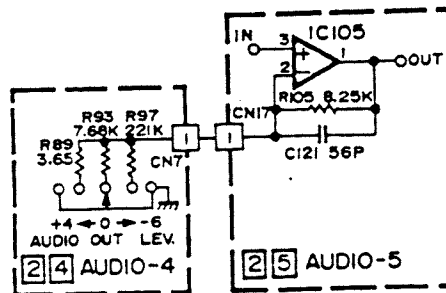


Fig. 8-4-1 Balanced-to-unbalanced converter circuit (L-ch)



Unbalanced Audio to Balanced output Audio Convertor

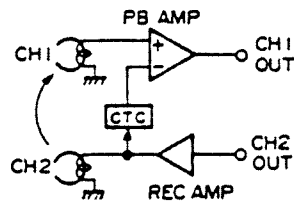


Fig. 8-4-8 Crosstalk canceller circuit

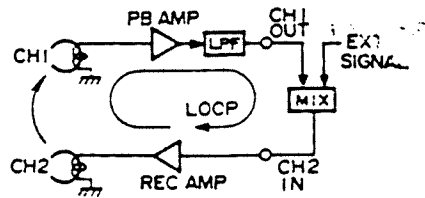
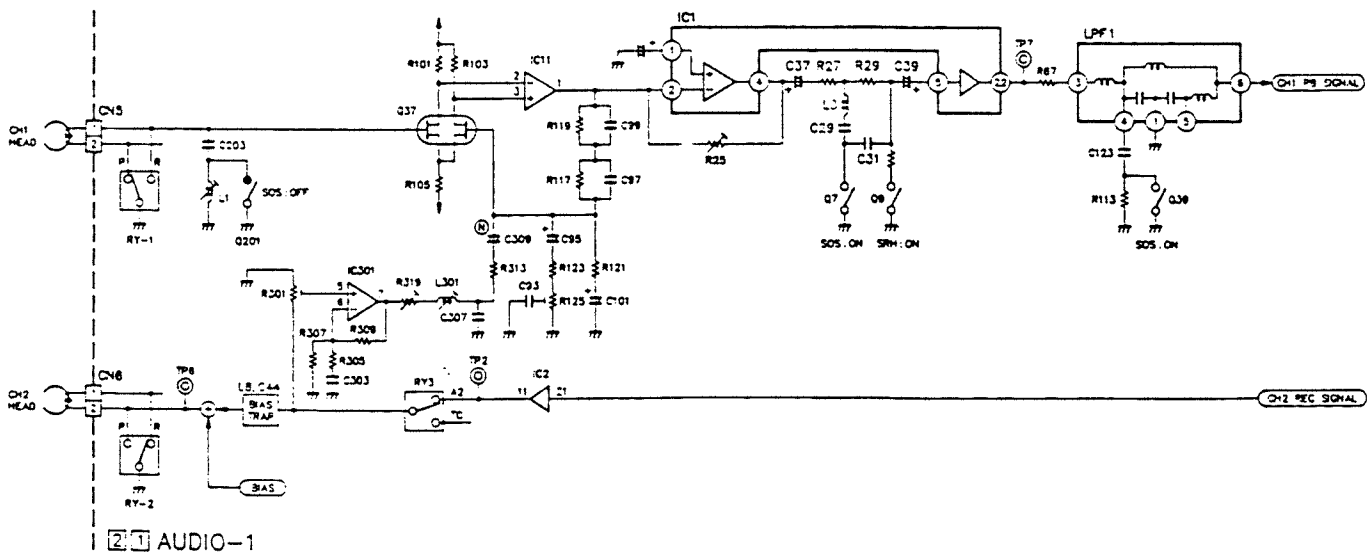
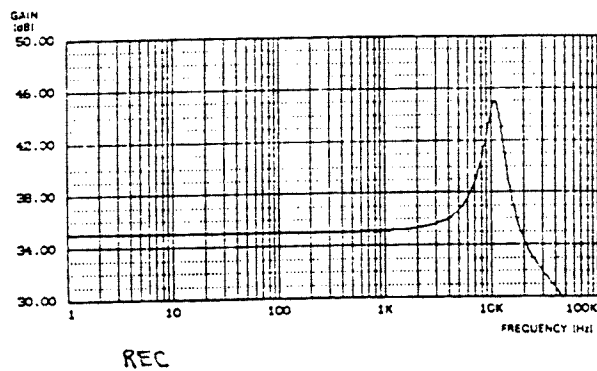


Fig. 8-4-9 SOS mode



Audio Crosstalk Canceller Circuit

Hi Fi Audio Circuit Block Diagram

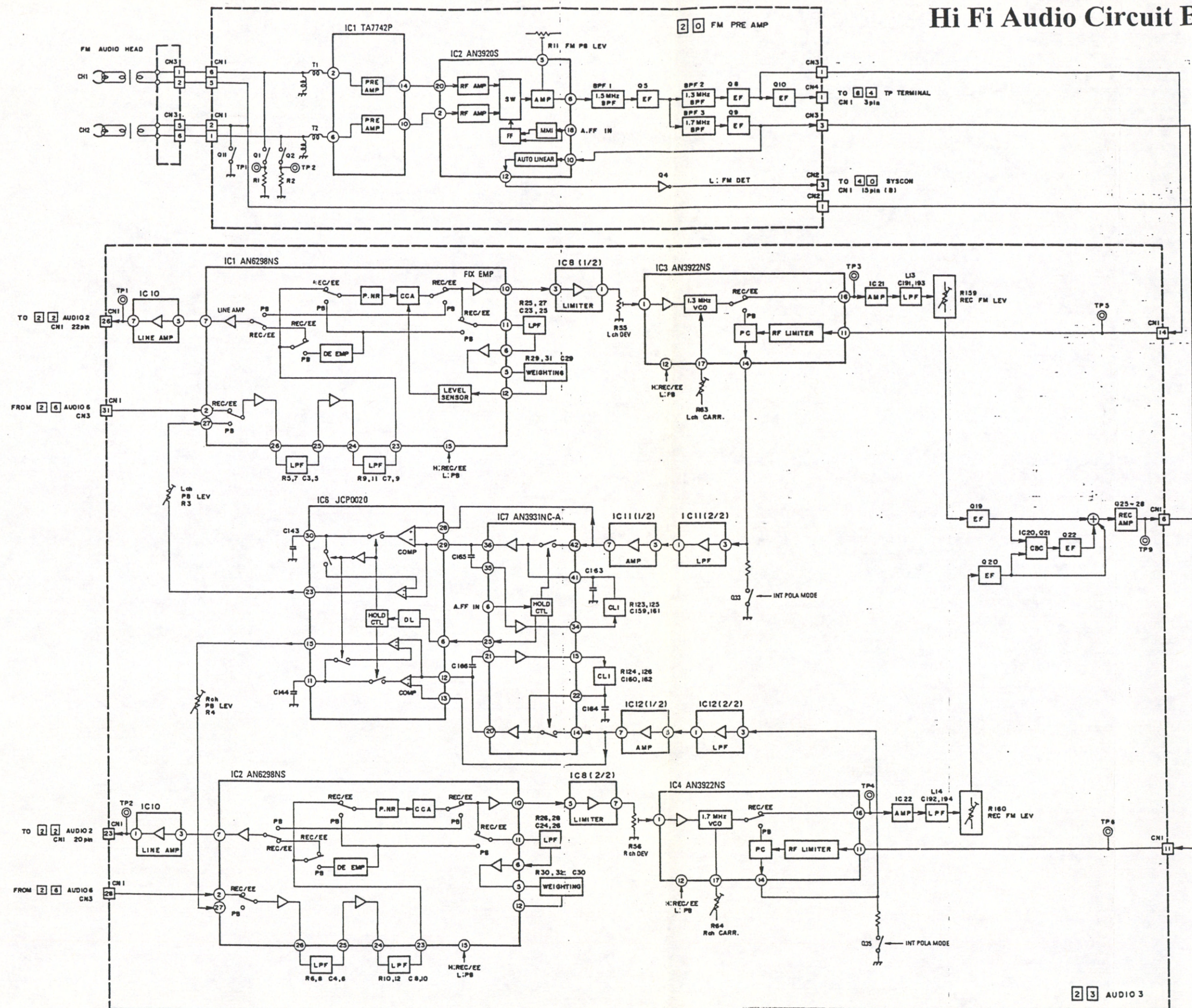


Fig. 8-5-1 Hi-Fi audio circuit block diagram

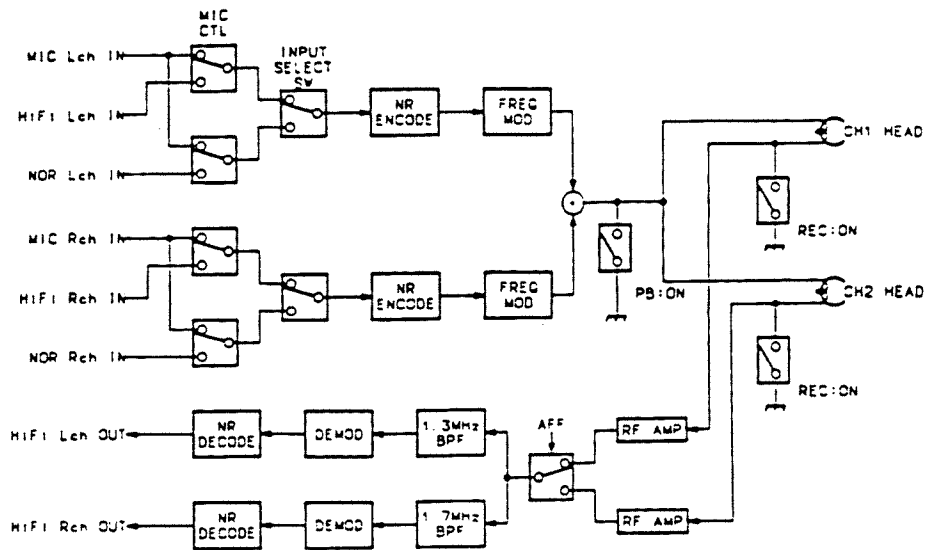


Fig. 8-5-2 FM audio block diagram

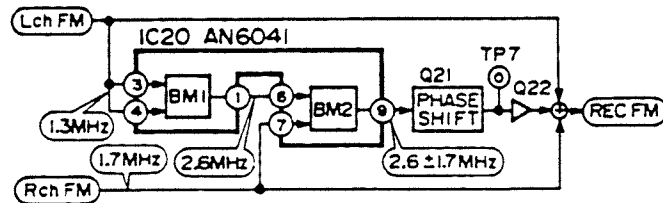


Fig. 8-5-4 Chroma beat cancel circuit

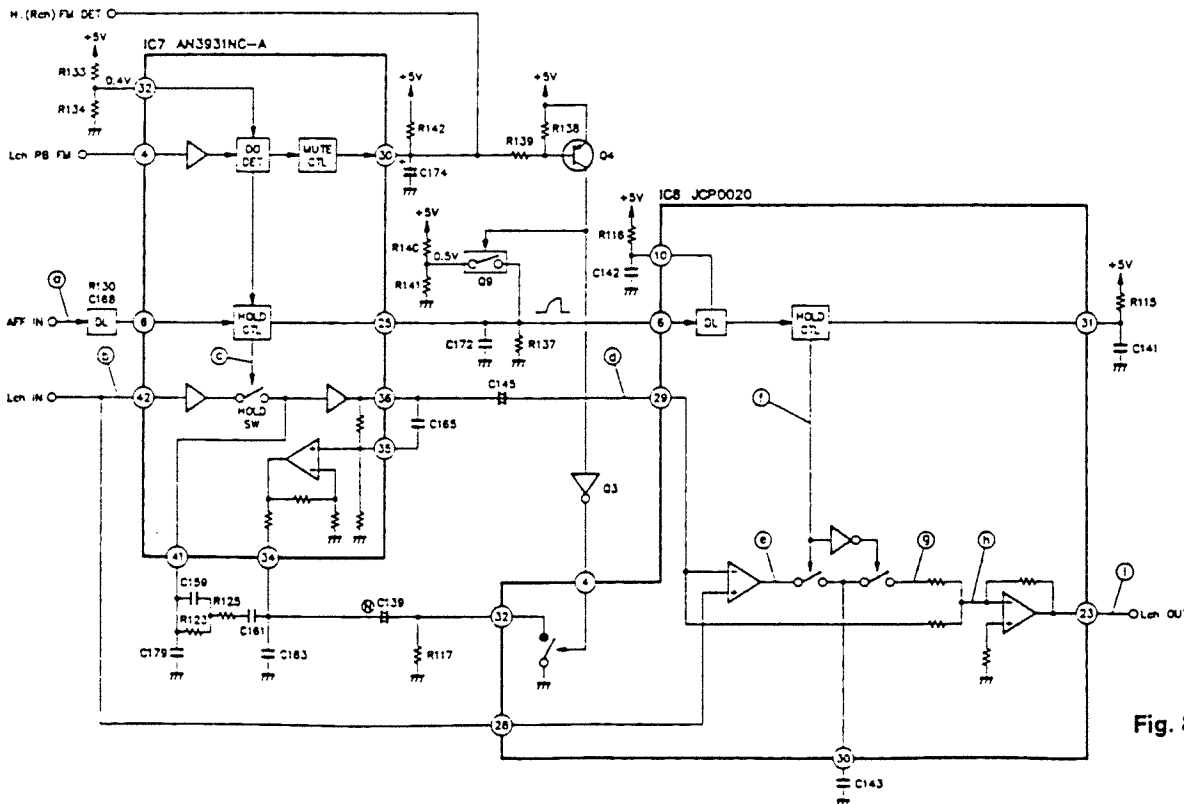


Fig. 8-5-8 Hypertandem system

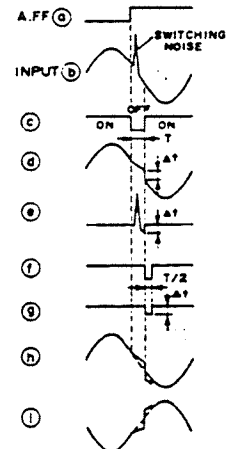


Fig. 8-5-9 Interpolation correction timing

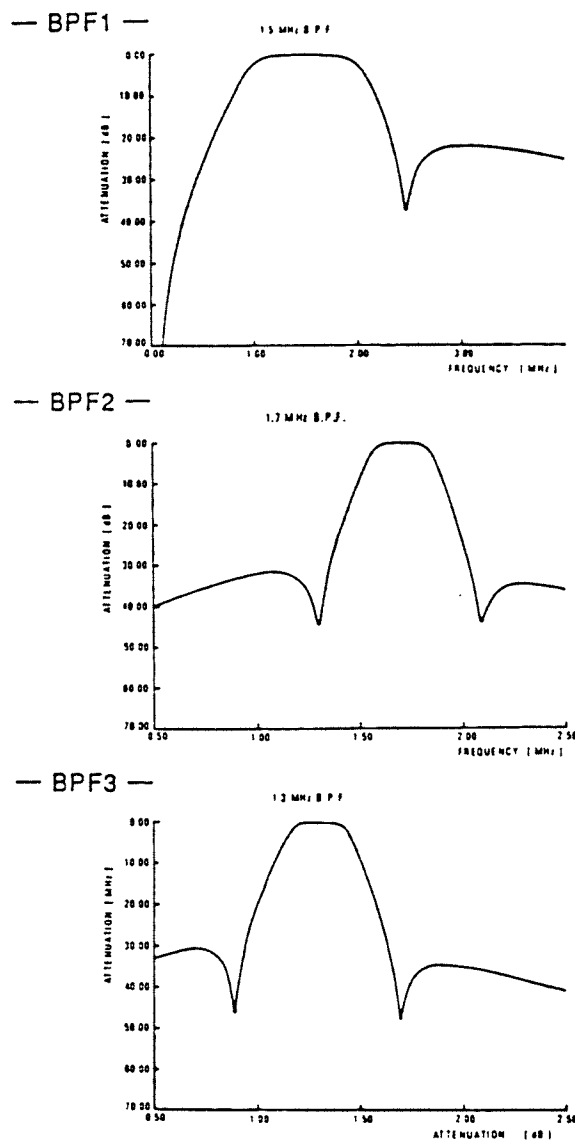


Fig. 8-5-5 Characteristics of BPFs

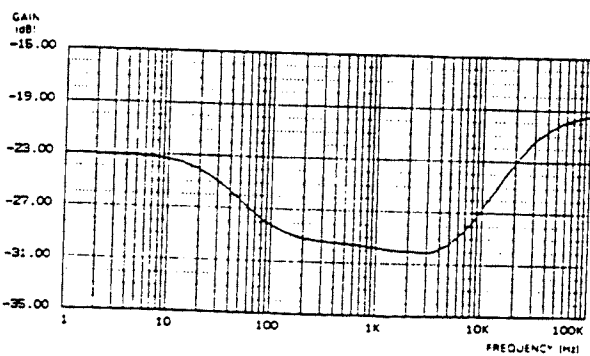


Fig. 8-4-2 Low boost circuit frequency response

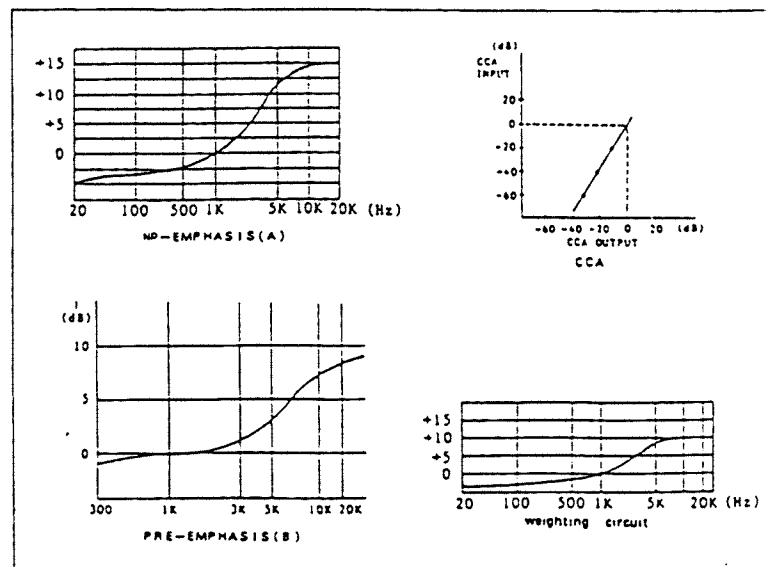


Fig. 8-5-3 Noise reduction characteristics

START CLOCK EDGE BETWEEN BIT 79 AND BIT 0

BIT NO. 0 4 8 12 16 20 24 28 32 36 40 44 48 52 56 60 64 68 72 76 79

FRAMES UNITS

1st BINARY GROUP

FRAMES TENS
DROP FRAME FLAG
COLOR FRAME FLAG

2nd BINARY GROUP

SECONDS UNITS

3rd BINARY GROUP

SECONDS TENS
UNASSIGNED ADDRESS BIT 27

4th BINARY GROUP

MINUTES UNITS

5th BINARY GROUP

MINUTES TENS
UNASSIGNED ADDRESS BIT 43

6th BINARY GROUP

HOURS UNITS

7th BINARY GROUP

HOURS TENS
UNASSIGNED ADDRESS BIT 58
UNASSIGNED ADDRESS BIT 59

8th BINARY GROUP

SYNC WORD

Fig. 1

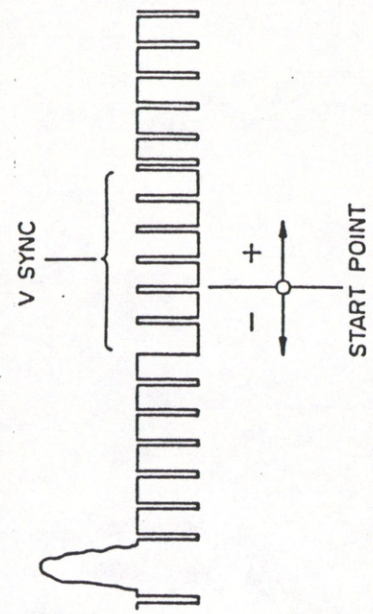
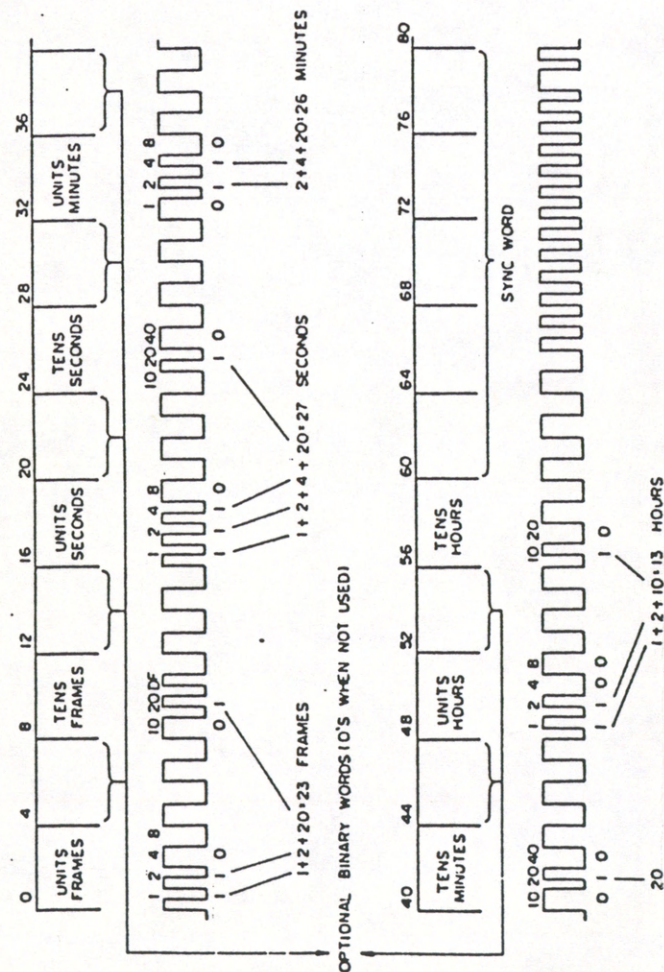


Fig. 1-4 Time code start point

V98.12M-1981



DATA SHOW: 13HOURS 26MINUTES 27SECONDS 23FRAMES

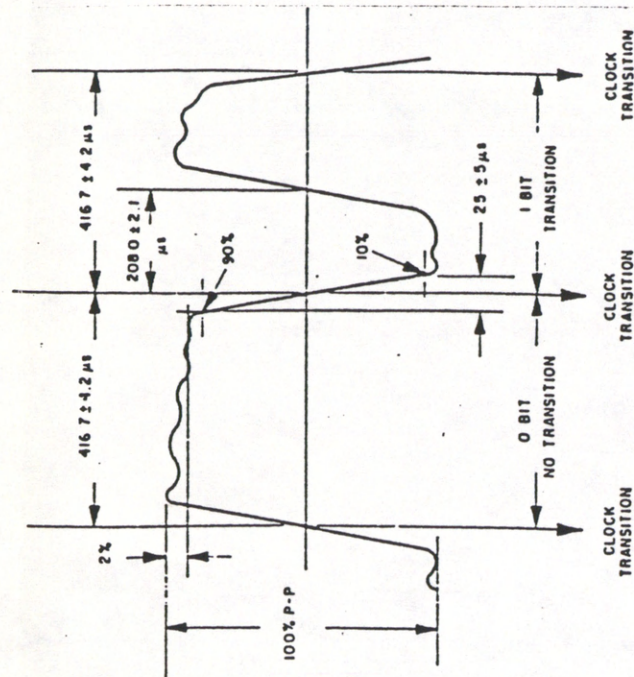


Fig. 2

3. VITC (Vertical Interval Time Code)

a) Code format

VITC which is encoded in vertical blanking period of video signal consists of 90 bits of data a period of 1H as shown in Fig. 9-1-5. It is written twice in a field and a time code is repeated four times in a frame, therefore, influences of dropout and noise bar in the still mode are minimized. Moreover, it is easy to distinguish between the 1st field and the 2nd field or between each field and others since VITC is inserted at a unit of a field.

b) Insertion point

As insertion points of VITC, it should be duplexed to two H lines which do not neighbor each other. In the models of this series insertion lines can be selected from among the 10H to the 25H lines by setting the memory switch. As setting at shipment, the 16H and 18H lines are prepared for VITC.

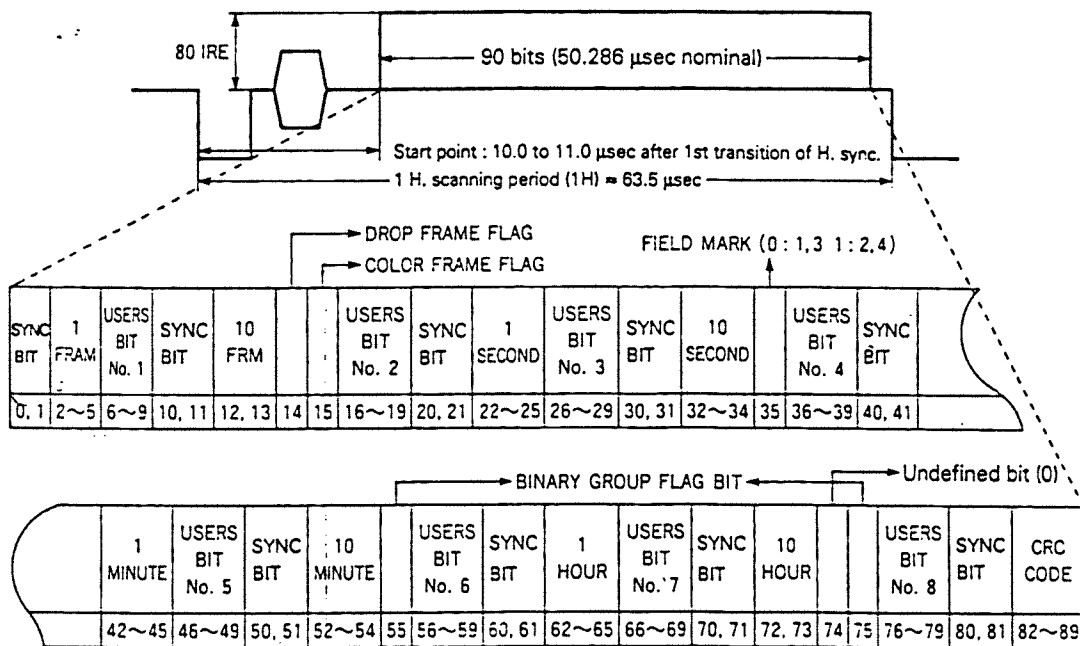


Fig. 9-1-5 VITC signal and bit allotment

4. Drop frame, Non-drop frame

In the NTSC system, there occurs time lag between time code and the real time because time code steps up at a cycle of 30 Hz while the frame frequency of color signal is 29.97 Hz. This time lag is 3.6 sec equivalent to +108 frames an hour, and it is a problem for a long time measurement. To solve it, the drop frame mode is devised. In detail, two frame numbers (00 and 01) are curtailed at every moving up in minute except at 0, 10, 20, 30, 40 and 50 minutes. (See Fig. 9-1-6.)

The drop frame mode reduces the time lag from the real time to the extent of 60 msec (for 1.8 frame).

For time codes recorded with the drop frame mode, the bit No. 10 is set to "1".

Hour	Min.	Sec.	Frame	
09	: 59	: 59	: 29	
10	: 00	: 00	: 00	} Frames 00 and 01 are not dropped since the minutes are aliquant by ten.
10	: 00	: 00	: 01	
10	: 00	: 00	: 02	
			:	
10	: 00	: 59	: 29	} Frames 00 and 01 are dropped and the frame 02 is moved up into the position of the frame 00 in succession to the frame 29 since the minutes are unaliquant by ten.
10	: 01	: 00	: 02	
10	: 01	: 00	: 03	

Fig. 9-1-6 Carry-up of time code in drop frame mode

a) Application of drop frame/non-drop frame mode

In editing of TV programs at postproductions, etc., it is important to manage the total time of a program and most of programs are managed by the drop frame mode. On the other hand, the non-drop frame mode is often used for programs that are comparatively simple in calculation of cutback in time and tape positions, etc.

Cut time calculation is easy in the non-drop frame mode, namely, that is done just by simple subtraction. On the other hand, the drop frame mode needs additional subtraction for 2 frames by number of drop frame times besides the same subtraction as for the non-drop frame mode. Although it is very troublesome to calculate this subtraction if cut time is long in total period, some electronic calculators for this purpose are put on the market.

b) Time code without drop frame

- The Hi-Vision (a type of HDTV developed in Japan) system does not require the drop frame mode since its frame frequency is 30 Hz.
- The PAL/SECAM system whose frame frequency is 25 Hz has no need of the drop frame mode since there is not time lag between the time code (steps up at a cycle of 30 Hz) and the real time, and the bit No. 10 is accordingly undefined yet.

5. User's bits

User's bits are generally used for the following data.

- 1) Year, month, day of recording or editing
 - 2) Identification number of tape
 - 3) Roll number of tape
 - 4) Information about automatic program transmission
 - 5) Control command for playback of video tape, etc.
- The models of this series is capable of recording the ID number of the set with user's bit. An ID number recorded once can be recalled again and again since it is written in EEPROM.

6. REC run/Free run

In general, the time code generator built in VTRs has two count modes of the following.

1. REC RUN :
Time code is counted during recording by VTR.
2. FREE RUN :
Time code is counted regardless of recording by VTR.
Therefore, this mode is available for getting information of the time of recording, etc. However, such a tape is edited, the recorded time code should be rewritten in dubbing, etc.

7. Regeneration/Preset

The time code generator built in VTRs generally has two recording modes of the following.

1. REGENE (regeneration) :
Time codes recorded on a tape are read by the VTR's time code reader and the same data is written in the generator again. This prevents the time code signal from getting deteriorated by multiple dubbing.
In general editing, time code is recorded in regeneration mode. (Time codes are in succession in the assembly editing mode - Jam Sync.)
2. PRESET :
Internally generated or externally input time code data are recorded as they are. For the built-in generator, the counter needs to preset on occasion. This mode is used for making blank tapes to be used for editing.

9.2 CIRCUIT DESCRIPTION

9.2.1 Outline

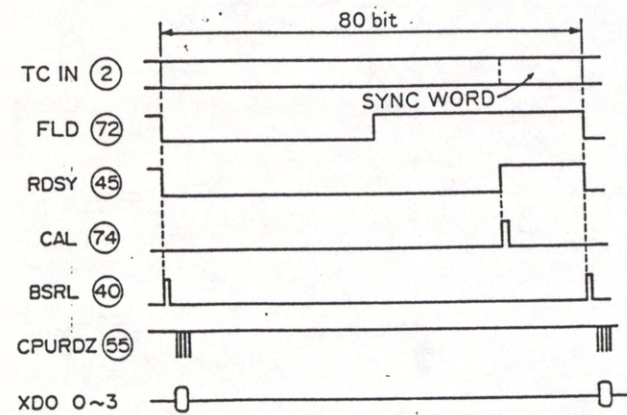


Fig. 9-2-3 LTC reader timing chart

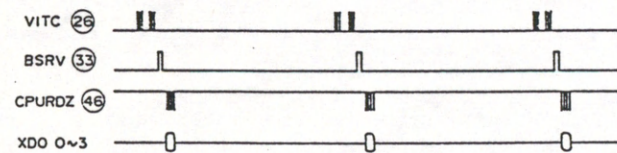


Fig. 9-2-5 VITC reader timing chart

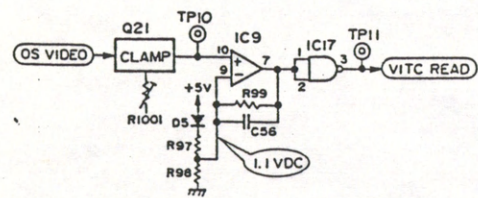
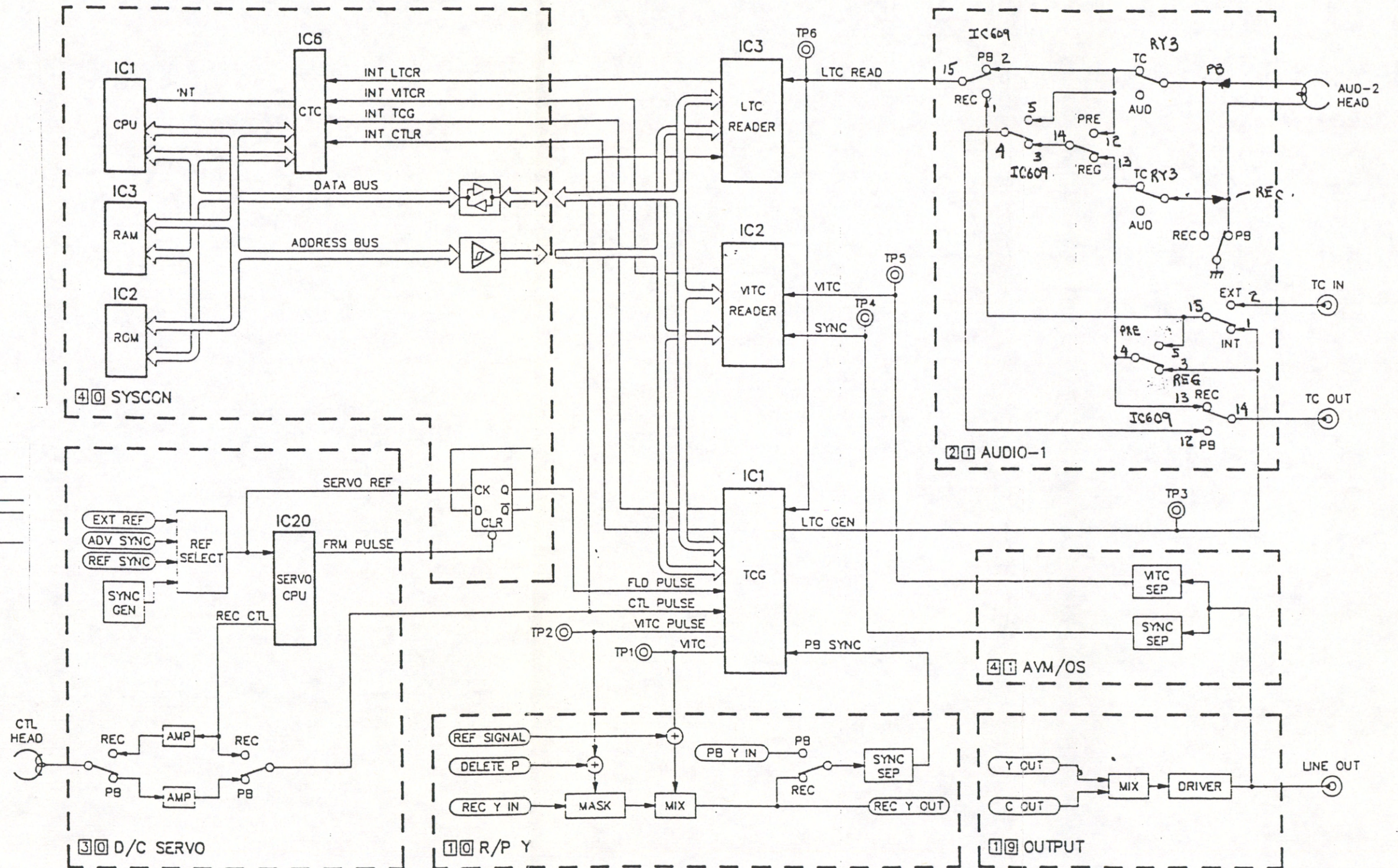
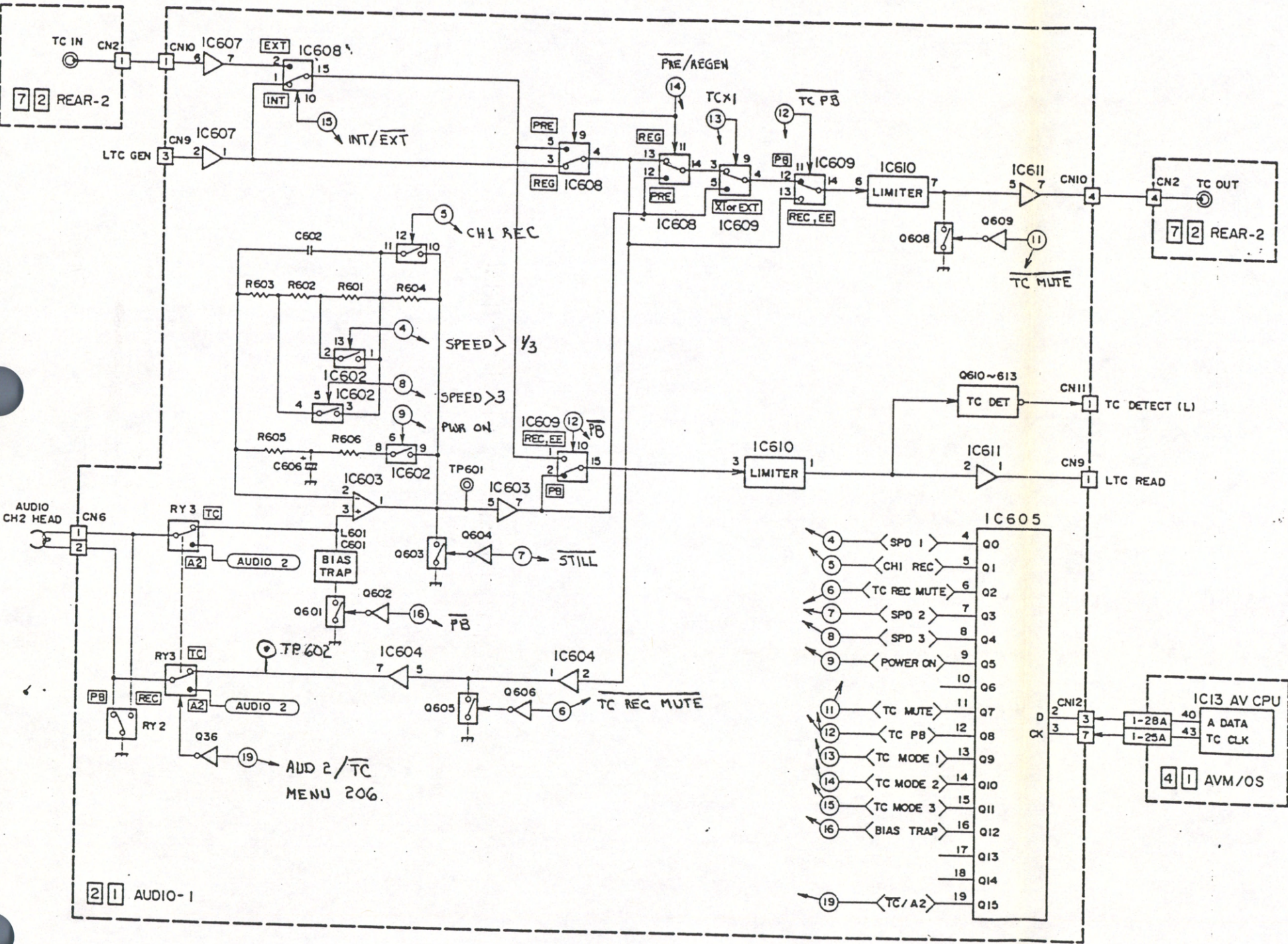


Fig. 9-2-4 VITC signal separation circuit (AVM/OS board)



3.2.2 LTC reader

IC3, the LTC reader, is supplied with LTC READ signal from the AUDIO-1 board.



• AUDIO 1 board C605 : For time code control

Pin No.	Signal Name	Function				
		Pin No.	STILL	Under ±1/3	±1/3 to 3	Over ±3
4	SPEED 1	④	L	L	H	H
7	SPEED 2	⑦	L	H	H	H
8	SPEED 3	⑧	L	L	L	H
5	CH1 REC*	H : In CH1 REC				
6	TC REC MUTE*	H : In TC REC				
9	POWER ON	H : For 3 seconds after power on				
10	S-VHS	L : In detection of S-VHS hole of cassette				
11	TC MUTE	L : When tape is stopping, for example, in Still and Stop modes, or In Loading/Unloading mode				
12	TC PB*	L : PB				
13	TC MODE 1	L : When tape speed is set at other than X1, or INT/EXT switch is set to "EXT".				
14	TC MODE 2	L : When PRESET/REGEN switch is set to "PRESET".				
15	TC MODE 3	L : When INT/EXT switch is set to "EXT".				
16	BIAS TRAP*	L : In CH1 REC				
17	FULL ERASE CTL	L : In REC, ASSEM mode				
18	CH1 INPUT	L : When memory switch No. 205 AUD-1 REC is set to "AUD-1/2 MIX".				
19	CH2 SELECT	L : When memory switch No. 206 AUD-2/LTC is set to "LTC".				

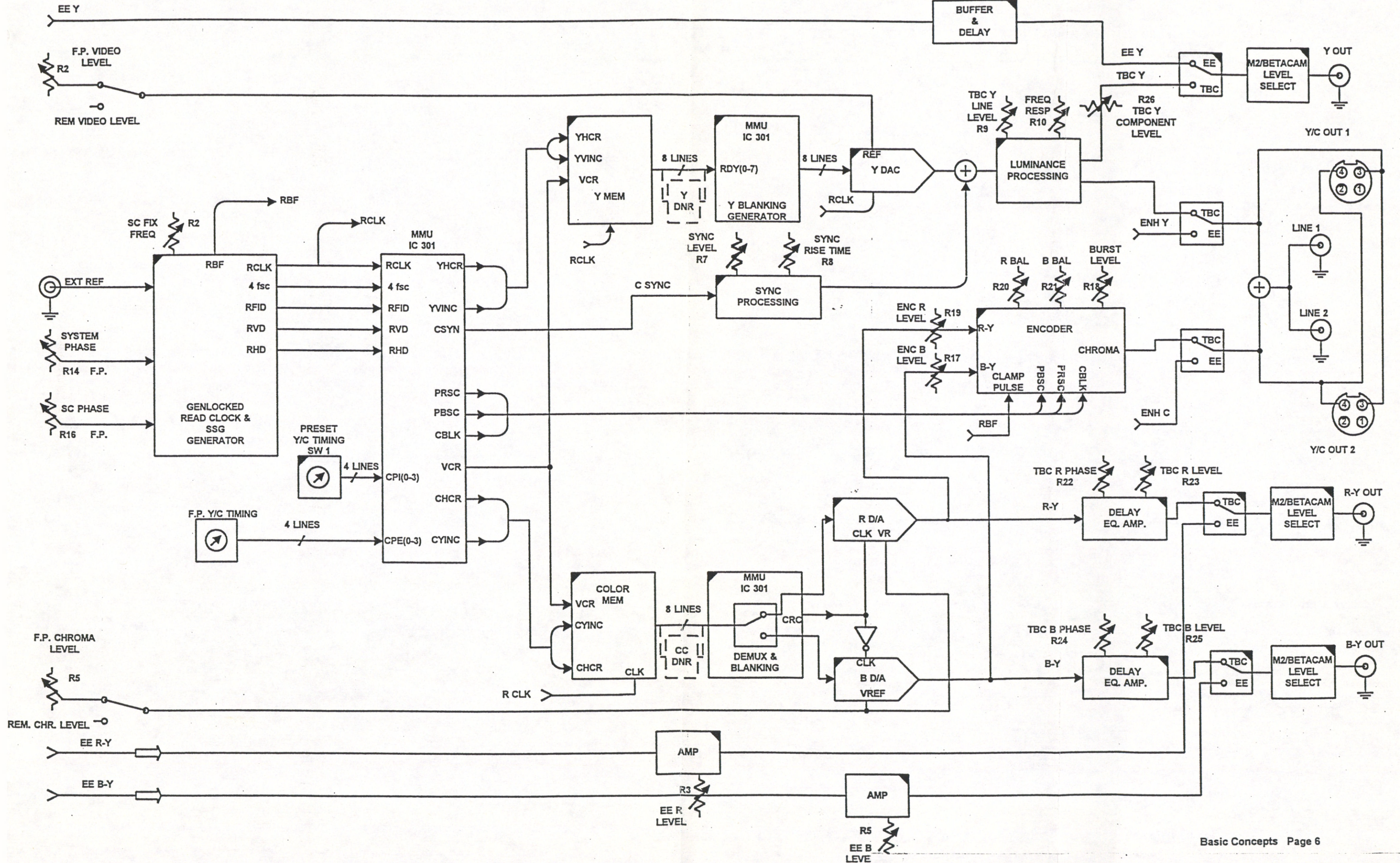
* : Mode switching signals whose output timings are controlled by AV microcomputer.

Table 3-7-4 IC605 pin functions

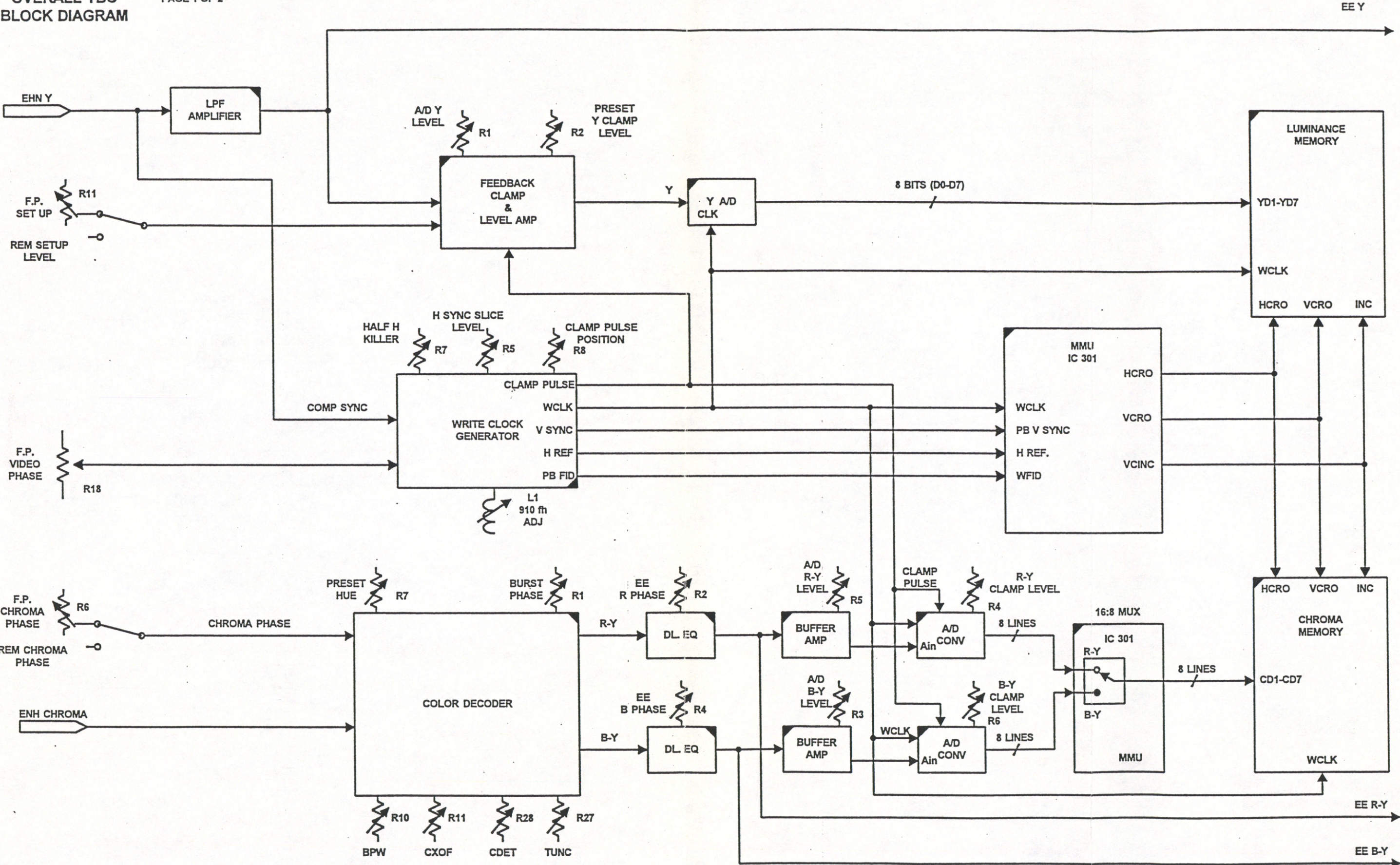
Fig. 9-2-2 LTC recording/playback circuit

OVERALL TBC BLOC DIAGRAM

PAGE 2 OF 2



OVERALL TBC
BLOCK DIAGRAM



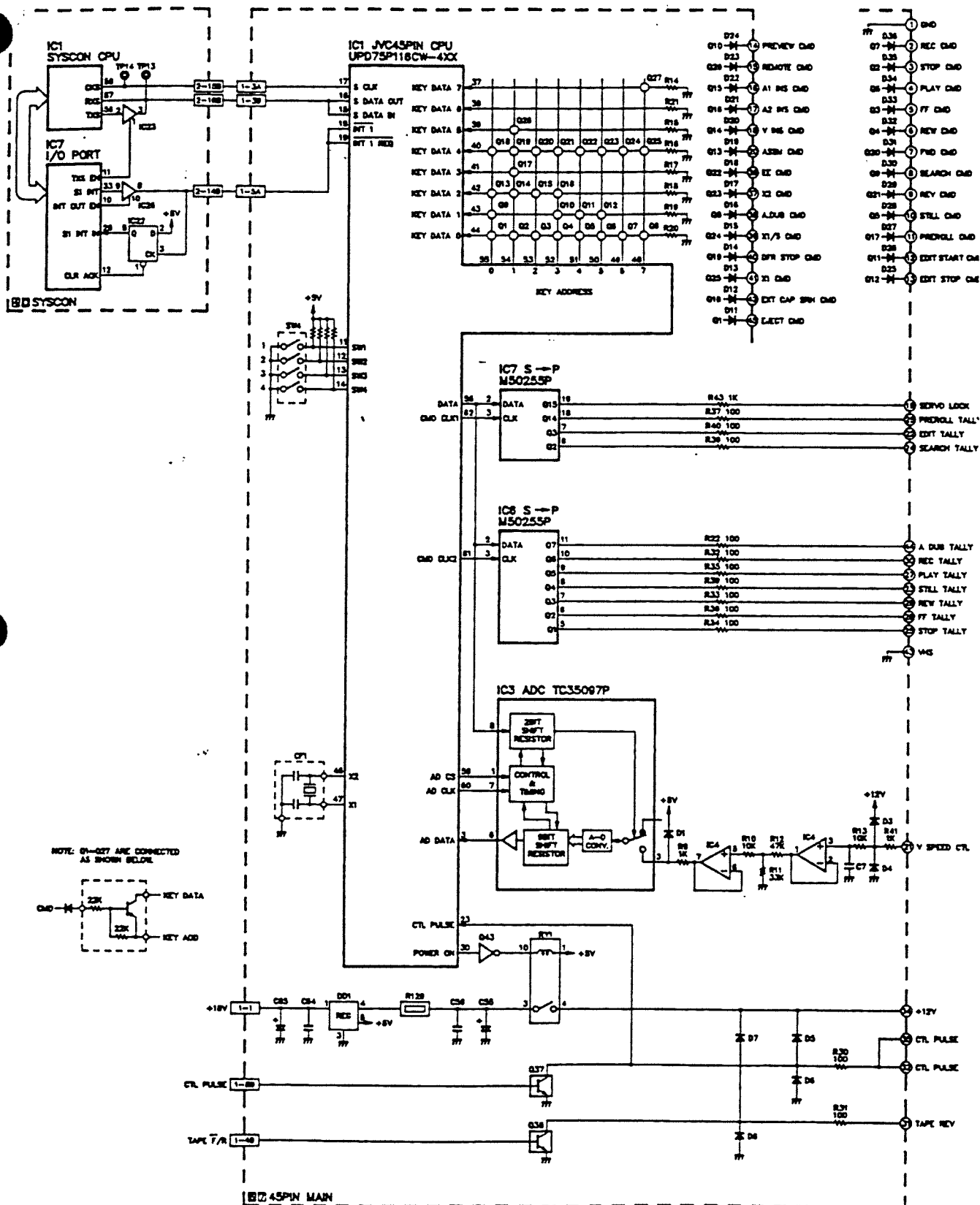
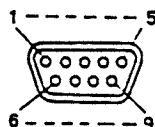


Fig. 10-2-1 45-pin MAIN board block diagram

2.6.1 General description

RS-232C is the standard interface for DCE (data circuit terminating equipment) of DTE (data terminal equipment) and MODEM (modulator/demodulator), etc.

The RS-232C standard specifies electrical specifications, kinds of signals, mechanical characteristics (specifications of connectors) and so on, and that is widely used as the input/output interface for peripheral equipment of modems and personal computers.



D-sub 9 pin connector

2.6.2 Pin arrangement and specifications of connector

The RS-232C port of the BR-S605U is designed as a DTE connector. Therefore, it requires a cross patch cable for connection with a DTE or one-to-one cable for connection with a DCE.

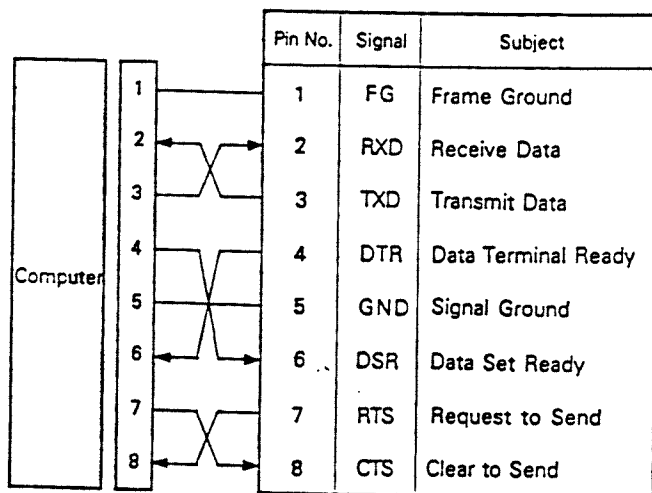


Fig. 2-18 D-sub 9 pin specifications

2.6.3 Data format

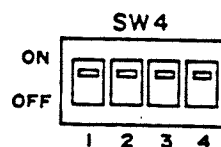
Data format is as illustrated below. Among of them, the baud rate can be selected by the internal switch on the board.

Signal level in the RS-232C has negative logic, namely, less than -3 V is for mark hold while more than $+3$ V is for space hold.

In the idle state in which no data is transmitted, the data line is in mark hold from which start of transmission is informed to the receiver by outputting the start bit of 1-bit space hold data. Henceforth, data bits are transmitted sequentially from the LSB to the stop bit of the mark hold bit. The length of the stop bit is set to 1 bit in the BR-S605U.

Selection of baud rate

SW4-1 and SW4-2 of the DIP switch on the RS-232C board are for selection of baud rate, which is initially set to 9600 bps at shipment from the factory.



SW4-1	SW4-2	Baud rate [bps]
OFF	OFF	1200
ON	OFF	2400
OFF	ON	4800
ON	ON	9600

Table 2-11 Boud rate selector

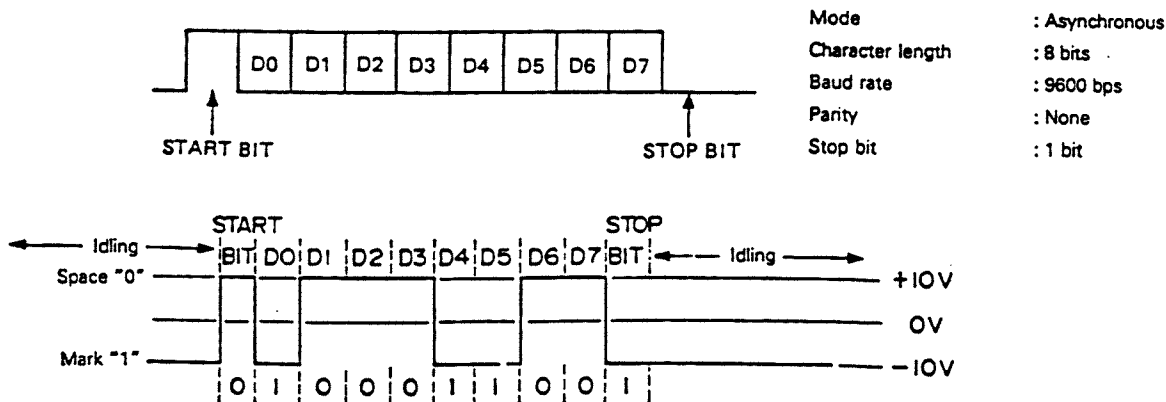


Fig. 2-19 RS-232C command

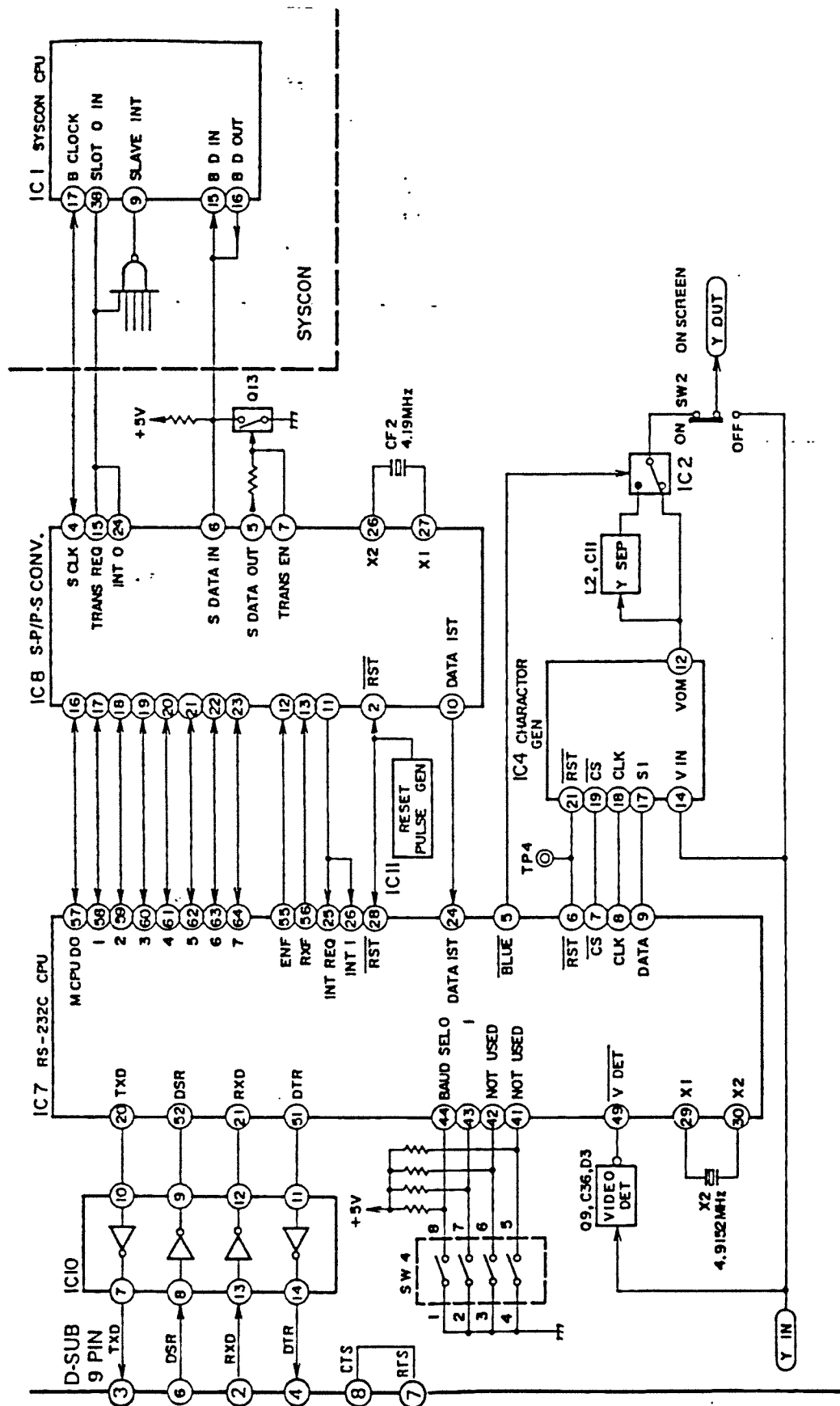
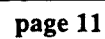


Fig. 2-21 RS-232C block diagram

SA-E68U BLOCK DIAGRAM



2.2 MAIN PARTS REPLACEMENT TABLE

Periodic inspection and maintenance are needed in order to ensure performance and reliability. The following table has been compiled simply to give a general idea regarding maintenance and inspection.

In practice, the periods indicated will vary widely

according to environmental and usage conditions.

Also be aware that rubber parts may deform and age even when the equipment is not used. The upper drum life is particularly affected by environmental and usage conditions.

	No.	Part Name	Part Number	Standard service period ※				Ref. Sect.	Remark
				1000	2000	3000	4000		
Tape transport system	①	Supply guide shaft	—	★	★	★	★	—	
	②	Tension arm ass'y	PQ45314A-2					2.3.9	
	③	Supply guide roller	PRD43721A					2.7.2	
	④	Full erase head	PU60616					—	
	⑤	Supply pole base ass'y	PRD30821B					2.3.15	
	⑥	Supply inertia roller	PGZ01667					2.3.4	Not included in Drum ass'y
	⑦	Take-up inertia roller	PGZ01667-02	★	★	★	●	2.3.4	Not included in Drum ass'y
	⑧	Take-up pole base ass'y	PRD30864A-01					2.3.15	
	⑨	A/C head	PGZ01536A					2.3.7	Excluding A/C Head board
	⑩	Take-up guide pole Upper flange Lower flange	PRD43733 PRD43732 PRD43670-01-01					2.7.3	
	⑪	Guide arm roller ass'y	PRD43404D					2.7.4	
	⑫	Capstan shaft	—	★	★	★	★	—	
	⑬	Pinch roller arm ass'y	PRD43387A-01	○	●	○	●	2.3.10	
	⑭	Drum ass'y	PDV2272B	★	★	○	●	2.3.6	For check, see 2.3.6.
	⑮	Upper drum ass'y	PRD20380B-1	●	●	●	(●)	2.3.4 / 2.3.5	Included in Drum ass'y
Drive system	⑯	Capstan motor	PGZ01535-01-01				●	2.3.11	
	⑰	Reel motor	PGZ01541A-04				●	2.3.12	Assembled part
	⑱	Loading motor	PRD44016A				●	2.3.13	
	⑲	Loading belt	PRD30022-12 PRD30022-16	●	●	●	●	2.3.13	Motor side Worm gear side
	㉑	Cassette motor	PQ45489A				●	2.3.2	
	㉒	Supply main brake	PRD43388A		●		●	2.3.14	
	㉓	Take-up main brake	PRD43395A		●		●	2.3.14	
	㉔	Take-up sub brake	PRD43479A		●		●	2.3.14	
Others	㉕	Brush ass'y (A)/(B)	PRD43986A/B		●		(●)	2.3.3	Included in Drum ass'y
	㉖	Slip ring ass'y	PGZ01630	○	●	○	(●)	2.3.4	Included in Drum ass'y
	㉗	Head cleaner	PRD40510-01-02	●	●	●	●	—	Not included in Drum ass'y

※ Know the standard service time by the drum's hour meter. For the capstan motor and the reel motor, perform service according to respective hour meters.

★ = Cleaning.

○ = Check and Replace if necessary, or Check and Clean.

● = Replacement.

(●) = Included in Drum ass'y.

SECTION 1 GENERAL DESCRIPTION:

Changes to the '22 Series VCRs

Recent products of the BR-S822U/BR-S622U/BR-S522U/BR-S525U have undergone alteration in the mechanism assembly and the FM AUDIO circuit for improvement of the workability and reliability.

The following table shows changes in the main parts with the serial numbers that are subject to the alterations of this time. For changes in exploded views and parts list, refer to the SECTION 5.

Note : This service manual mentions the parts that are changed this time and the replacing procedure of them, etc. Therefore, use this service manual together with the service manuals issued for the respective models.

Service manual No.9246C : BR-S822U, BR-S622U, BR-S522U

Service manual No.9272 : BR-S525U

		BR-S822U BR-S622U	BR-S522U	BR-S525U
Change in mechanism assembly	Main deck	Main deck used in BR-S800/BR-S500 serves in common.		
	Pinch roller solenoid	Peripheral parts of pinch roller, loading motor, etc. are changed. (to improve maintenance efficiency).		
	A/C head	Peripheral parts are changed to reduce off azimuth of A/C head after adjustment.		
	Full erase head	Head base is added with change of main deck.		
	Tension release solenoid	Removed		
	M-CTL/REEL SERVO board assembly	Change of software with removal of tension release solenoid.*1		
		IC1: Change to PGD30241C-10-9		IC1: Change to PGD30241C-11-13
DECK TERMINAL board assembly	Some parts are removed with removal of tension release solenoid. (CN103, CN104, D101, D102)			
Change in audio circuit	MOTHER-1 board assembly	PRK10113F-01	PRK10113B-01	PRK10149D
	MOTHER-2 board assembly	PRK10111F-01	PRK10111B-02	PRK10111D-02
	AUDIO-3 board assembly	PRK10115A	PRK10115C	
	FM AUDIO PRE/REC AMP board assembly	Removed		
	AVM/ONSC board assembly	PRK20089E		

※1 : The new software is programmed to avoid tape creep by reducing tape tension when the MENU No. 308/309 (LONG PAUSE) is set to "T.RELEASE".

Table 1-1 Changes in main parts

	BR-S822U	BR-S622U	BR-S522U	BR-S525U
MECHANISM assembly	#3601-	#3401-	#0601-	#1031-
AUDIO circuit	#3291-	#3151-	#0401-	#0931-

SECTION 2 MECHANISM ADJUSTMENT

2.1 GENERAL DESCRIPTION

2.1.1 Precautions

1. Before use of a soldering iron, make sure to disconnect the power cord of the set from the outlet.
2. Do not pull connector cables strongly for disconnecting connectors.
3. Do not disturb VRs and other adjusting parts with a trouble of unknown origin.
4. When inserting a cassette tape into the set, place the set correctly horizontally. Under the circumstances that the set is laid on its side or its rear, or upside down, insertion of a cassette may damage the cassette housing.

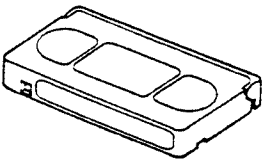
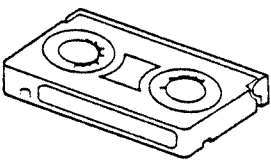
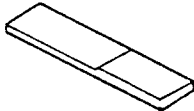
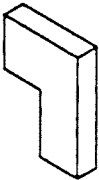
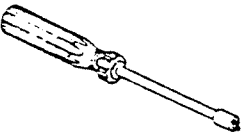
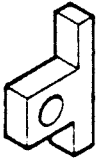
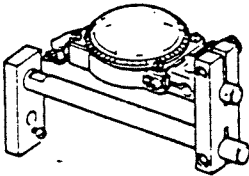
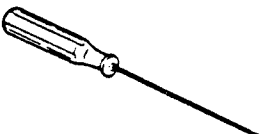

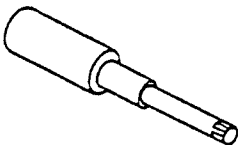
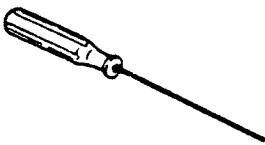
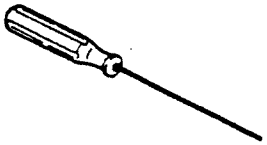
2.1.2 Mechanism operation check

For operating the mechanism without the cassette housing, proceed to do the following steps.

1. Remove the cassette housing from the set and disconnect the connector CN1 of the CASSETTE HOUSING board.
2. Shortcircuit pin 3 and pin 5 of the connector cable with each other.
3. Set a cassette tape on the main deck, and select an operation mode with operation buttons.

2.1.3 Jigs and special tools for mechanism adjustment

The following jigs and special tools are necessary for adjusting the mechanism.

Alignment tapes MHP, MBA, MBA-3, MBP-X	Cassette torque meters PUJ42881/PUJ42881B	Parallel check plate PGJ04035	Height gauge PGJ04032
			
Taper nut driver PUJ50637	Tension pole positioning jig PGJ04031	Microchecker PUJ49712-2	Hex. driver PGJ04034
			
Line head wrench PGJ04033	Guide arm height adjustment driver PGJ04036	⊕ Driver (3 mm) PGJ04037	⊕ Driver (2.6 mm) PGJ04038
			

Besides those shown in the table, nut drivers (7 mm, 9 mm) and hexagon keys (1.27 mm, 2 mm) are necessary tools.

Table 2-1-1

Alignment Tape Specifications

•MHP

Video signal	Audio signal	Application	Remark
VHS SP mode Stairstep	7kHz	•For check adjustment of interchangeability •For adjustment of PB swiching point	MH-1 stairstep signal substitutable.

•MHV-2

Video signal	Audio signal	Application	Remark
VHS SP mode Color bar	—	•For check and adjustment of video PB circuit	MH-1 color bar signal is substitutable.

•MBA

Video signal	Audio signal	Application	Remark
CTL signal only	1kHz(0dB)	•For check and adjustment of audio PB circuit	MH-1 1kHz signal is substitutable.

•MH-6

No.	PB time	Video signal	Audio signal	Application
1	2 minutes	Color sweep	400Hz(−20dB)	•Check and adjustment of video signal's frequency response in PB circuit. •Check and adjustment of audio signal's frequency response in PB circuit.
2	2 minutes	Color sweep	100Hz(−20dB)	
3	2 minutes	Color sweep	10kHz(−20dB)	
4	4 minutes	Color sweep	—	

•MH-F6

No.	PB time	Video signal	Audio signal	Application
1	5 minutes	—	Carrier only	Check and adjustment of interchangeability of mechanism.
2	5 minutes	Stairstep	Carrier only	Check and adjustment of interchangeability of mechanism.
3	5 minutes	—	1kHz (±50kHz DEV)	Check and adjustment of FM audio PB circuit.

•MHV-2H

Video signal	Audio signal	Application	Remark
S VHS SP mode Color bar	—	•For check and adjustment of video PB circuit	MH-1 color bar signal is substitutable.

•MBV-14H

Video signal	Audio signal	Application	Remark
S-VHS SP mode Sweep	—	• For AUTO EQ adjustment	—

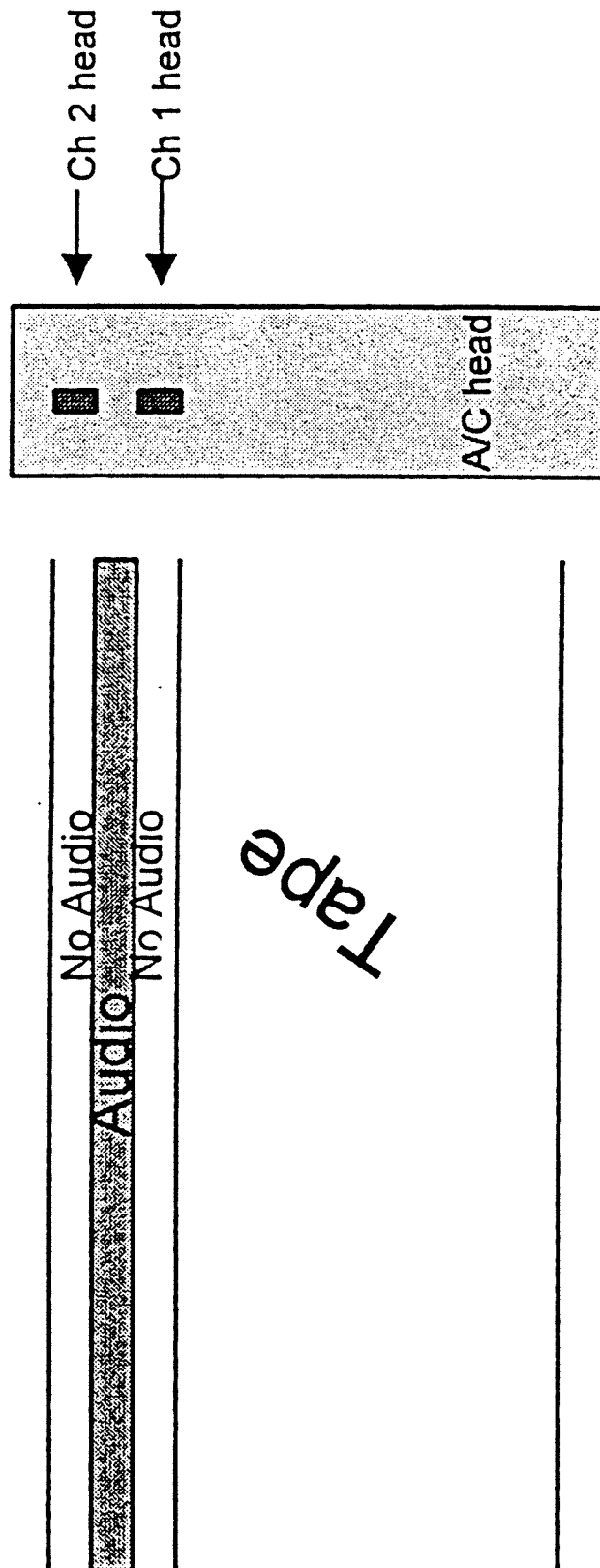
•MBV-3H

Video signal	Audio signal	Application	Remark
S VHS SP mode Video sweep	—	•For check and adjustment of video frequency response	Only MHV-3H part name changed.

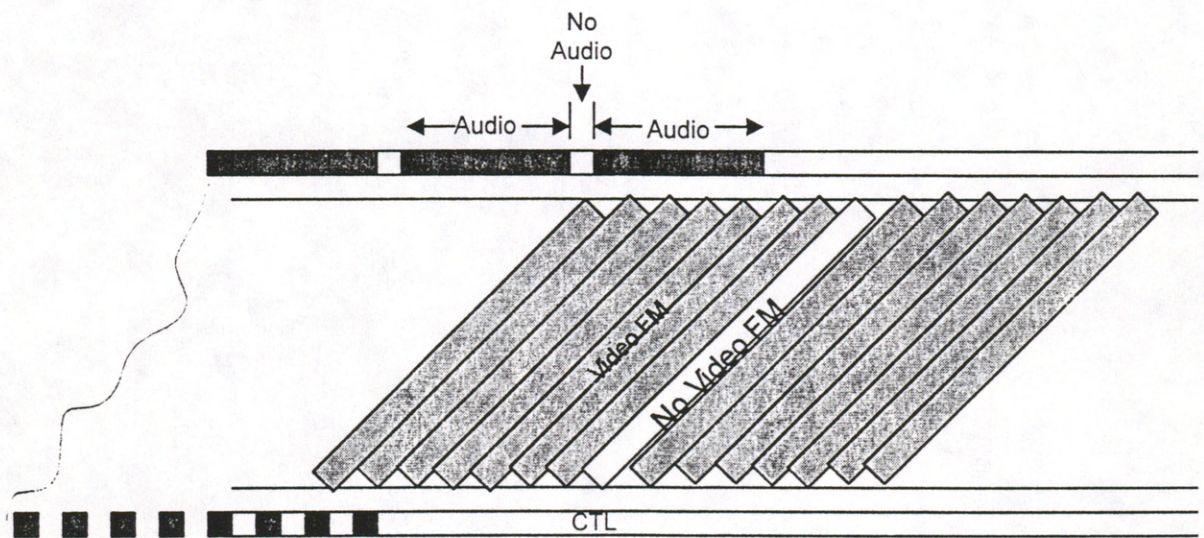
•MBAF-3

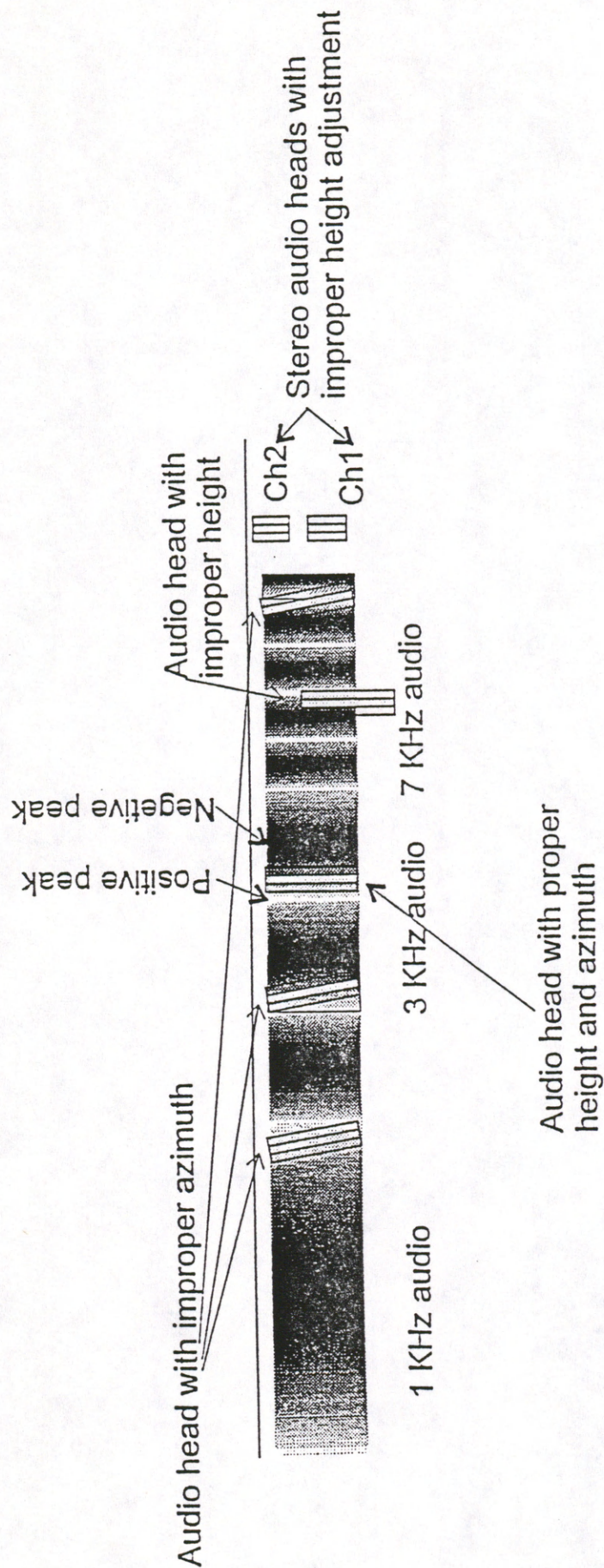
Video signal	Audio signal	Application	Remark
Carrier only (4MHz)	1kHz (±50kHz DEV)	Check and adjustment of FM audio PB circuit.	—

MBA-3 Alignment Tape



MBP - X X Value Tape





M-H1 Alignment Tape

Internal Switch Settings

Note:

- For location of respective switches, see "Location of test points and adjustment parts" at the back of the section 3.
- Numeral and alphabet in parentheses (3 F, for example) following a symbol number indicates the section where the parts is located in the board.

1.3.1 Function of switch

1.0 R/P Y

Symbol No.	Switch Name	Setting at Shipment	Function
S1 (4 I)	DOC switch	S1 OFF <input type="checkbox"/> ON	ON : DOC circuit is activated except in SEARCH mode. OFF : DOC circuit is inactivated.

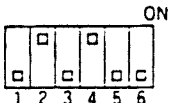
1.2 R/P COLOR (1.3 CTC DL)

Symbol No.	Switch Name	Setting at Shipment	Function
S1 (12 I)	Adjusting switch	S1 ADJ <input type="checkbox"/> NORM	ADJ : Switching point shift circuit is inactivated. NORM : Switching point shift circuit is activated. Normally set to NORM position.
SW1 (3F)	Adjusting switch	SW1 ADJ <input type="checkbox"/> NORM	ADJ : Crosstalk cancel circuit is set to adjusting mode. NORM : For normal operation Normally set to NORM position. Setting to ADJ position makes playback picture untinted.

1.6 R/P ADJUST

Symbol No.	Switch Name	Setting at Shipment	Function
S1 (4E)	Adjusting switch	S1 RAP <input type="checkbox"/> NORM	RAP : For adjusting mode of playback picture recorded by the same set. For detail, refer to the Technical Guide No. T9022 for BR-S822U/S622U (6.19 RAP mode). NORM : For normal operation Normally set to NORM position.
S2 (4E)	Adjusting switch	S2 RAP 2 <input type="checkbox"/> RAP 1	Effective with S1 set to RAP position RAP 1 : For CH-1 adjusting mode RAP 2 : For CH-2 adjusting mode

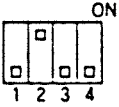
17 Y COMB

Symbol No.	Switch Name	Setting at Shipment	Function																																							
S1-1 (3D)	V. BLANKING SELECT switch	S1	To set V. blanking period from 10 H to: ON : 20 H OFF : 21 H																																							
S1-2 S1-3	} Adjusting switch		To be used for adjustment of the video circuit (Sect. 3.4)																																							
S1-4 S1-5 S1-6																																										
	REF. SIGNAL LINE SELECT switch for AUTO EQ		<table border="1"> <thead> <tr> <th colspan="3">SW1</th> <th rowspan="2">Reference signal addition line</th> </tr> <tr> <th>4</th><th>5</th><th>6</th> </tr> </thead> <tbody> <tr> <td>ON</td><td>ON</td><td>ON</td><td>Non-addition</td></tr> <tr> <td>ON</td><td>ON</td><td>OFF</td><td>14 H</td></tr> <tr> <td>ON</td><td>OFF</td><td>ON</td><td>15 H</td></tr> <tr> <td>OFF</td><td>ON</td><td>ON</td><td>16 H</td></tr> <tr> <td>ON</td><td>OFF</td><td>OFF</td><td>17 H</td></tr> <tr> <td>OFF</td><td>ON</td><td>OFF</td><td>18 H</td></tr> <tr> <td>OFF</td><td>OFF</td><td>ON</td><td>19 H</td></tr> <tr> <td>OFF</td><td>OFF</td><td>OFF</td><td>20 H</td></tr> </tbody> </table> <ul style="list-style-type: none"> In Recording Select a reference signal addition line for the AUTO EQ circuit with these switches. When the default line (17 H) is in use, select another line referring to the above table. In Playback Set these switches for the line used to record reference signal for the AUTO EQ circuit. 	SW1			Reference signal addition line	4	5	6	ON	ON	ON	Non-addition	ON	ON	OFF	14 H	ON	OFF	ON	15 H	OFF	ON	ON	16 H	ON	OFF	OFF	17 H	OFF	ON	OFF	18 H	OFF	OFF	ON	19 H	OFF	OFF	OFF	20 H
SW1			Reference signal addition line																																							
4	5	6																																								
ON	ON	ON	Non-addition																																							
ON	ON	OFF	14 H																																							
ON	OFF	ON	15 H																																							
OFF	ON	ON	16 H																																							
ON	OFF	OFF	17 H																																							
OFF	ON	OFF	18 H																																							
OFF	OFF	ON	19 H																																							
OFF	OFF	OFF	20 H																																							
S2 (4C)	COLOR / B/W	S2 B/W <input type="checkbox"/> NOR	NOR : To activate comb filter always. B/W : To inactivate comb filter at all.																																							


19 OUTPUT

Symbol No.	Switch Name	Setting at Shipment	Function
SW1 (8 I)	AUTO EQ switch	SW1 AUTO <input type="checkbox"/> MANU	AUTO : In S-VHS playback mode, if reference signal is recorded on the line selected by S1-4, -5 and -6 of 17 Y COMB board, AUTO EQ functions. MANU : AUTO EQ does not function. Normally set to AUTO position.
D5 (10 I)	AUTO EQ REF. SIGNAL DETECTION LED	—	In S-VHS playback mode, if reference signal is recorded on the line selected by S1-4, -5 and -6 of 17 Y COMB board, AUTO EQ REF. SIGNAL DET. LED lights regardless of SW1 setting.

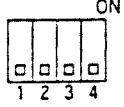
6.0 TBC-1 (SA-T22U optional)

Symbol No.	Switch Name	Setting at Shipment	Function
SW1 (4 I)	Adjusting switch (Y/C TIMING)	—	Refer to Item No. 15 "Y/C timing adjustment" of TBC-1 circuit in SA-T22U SERVICE MANUAL (No. 9251)
SW2-1 (9H)	NTSC V. BLANKING PERIOD SELECT switch	SW2 	To set V. blanking period on TBC circuit as follows. ON : WIDE (20 H) OFF : NARROW (19 H)
SW2-2	NTSC/PAL		ON : NTSC (Make sure to set to ON.) OFF : PAL
SW2-3	Adjusting switch (FORCE TBC switch)		ON : To activate TBC forcibly regardless of setting of the TBC switch on the front sub panel (on back of the operation panel). OFF : TBC functions depending on the TBC switch. Normally set to OFF position.
SW2-4	Not used		—

6.1 TBC-2 (SA-T22U optional)

Symbol No.	Switch Name	Setting at Shipment	Function
SW1 (1D)	Adjusting switch	SW1 ADJ  NOR	NOR : For normal operation ADJ : For adjustment mode Normally set to NOR position.

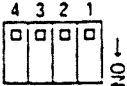
6.2 TBC-3 (SA-T22U optional)

Symbol No.	Switch Name	Setting at Shipment	Function
SW1-1 (3H)	Adjusting switch	SW1 	ON : For decoder adjustment mode OFF : For normal operation Normally set to OFF position.
SW1-2	SYNC DETECT MODE switch		ON : For period detection mode OFF : For width detection mode and period detection mode
SW1-3	W. CLOCK SELECT (1)		ON : For AFC mode OFF : For APC selection mode to affect SW1-4
SW1-4	W. CLOCK SELECT (2)		With SW1-3 set to OFF: ON : For APC mode OFF : For AFC-APC automatic selection mode

3.1 M. CTL & R. SERVO

Symbol No.	Switch Name	Setting at Shipment	Function																																																																																					
SW1	Adjusting switch	SW1 <div><div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div></div><div><div>1</div><div>2</div><div>3</div><div>4</div></div><div>ON</div></div>	<p>Normally set SW1 to OFF.</p> <p>When power is turned on after SW1 was set, mode changes as shown in the following table.</p> <p><i>Note: If power is turned on with SW1 set on all, adjustment data of R. SERVO circuit will be initialized. On such an occasion, readjust R. SERVO circuit again (see 2.5).</i></p> <table><tr><th>1</th><th>2</th><th>3</th><th>4</th><th>Mode</th></tr><tr><td></td><td></td><td></td><td></td><td>Normal operation</td></tr><tr><td>ON</td><td></td><td></td><td></td><td>Load end stop mode, Reel FG duty adjustment mode</td></tr><tr><td></td><td>ON</td><td></td><td></td><td>F. cassette loading torque check mode</td></tr><tr><td>ON</td><td>ON</td><td></td><td></td><td>Play back tension adjustment mode, Warning tension setting mode</td></tr><tr><td></td><td></td><td>ON</td><td></td><td>C. cassette loading torque data setting mode (Up)</td></tr><tr><td>ON</td><td></td><td>ON</td><td></td><td>C. cassette loading torque data setting mode (Down)</td></tr><tr><td></td><td>ON</td><td>ON</td><td></td><td>Inhibit</td></tr><tr><td>ON</td><td>ON</td><td>ON</td><td></td><td>Inhibit</td></tr><tr><td></td><td></td><td></td><td>ON</td><td>Emergency roll mode</td></tr><tr><td>ON</td><td></td><td></td><td>ON</td><td>Inhibit</td></tr><tr><td></td><td>ON</td><td></td><td>ON</td><td>Inhibit</td></tr><tr><td>ON</td><td>ON</td><td></td><td>ON</td><td>Inhibit</td></tr><tr><td></td><td></td><td>ON</td><td>ON</td><td>Reverse torque data setting mode (Up)</td></tr><tr><td>ON</td><td></td><td>ON</td><td>ON</td><td>Reverse torque data setting mode (Down)</td></tr><tr><td></td><td>ON</td><td>ON</td><td>ON</td><td>Starting torque check mode</td></tr><tr><td>ON</td><td>ON</td><td>ON</td><td>ON</td><td>Single unit adjustment mode (To initialize adjustment data)</td></tr></table>	1	2	3	4	Mode					Normal operation	ON				Load end stop mode, Reel FG duty adjustment mode		ON			F. cassette loading torque check mode	ON	ON			Play back tension adjustment mode, Warning tension setting mode			ON		C. cassette loading torque data setting mode (Up)	ON		ON		C. cassette loading torque data setting mode (Down)		ON	ON		Inhibit	ON	ON	ON		Inhibit				ON	Emergency roll mode	ON			ON	Inhibit		ON		ON	Inhibit	ON	ON		ON	Inhibit			ON	ON	Reverse torque data setting mode (Up)	ON		ON	ON	Reverse torque data setting mode (Down)		ON	ON	ON	Starting torque check mode	ON	ON	ON	ON	Single unit adjustment mode (To initialize adjustment data)
1	2	3	4	Mode																																																																																				
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	ON	ON	ON	Starting torque check mode																																																																																				
ON	ON	ON	ON	Single unit adjustment mode (To initialize adjustment data)																																																																																				
SW2	Tact switch for adjustment	—	<p>To be used in adjustment mode.</p> <p>To raise/decline torque and to set data in adjustment modes set by SW1. Also used to roll up tape in emergency roll mode.</p>																																																																																					

6.5 TIME CODE G/R (SA-R22U optional)

Symbol No.	Switch Name	Setting at Shipment	Function
S8-1 (13A)	VITC position change switch	S8 	For changing VITC position in horizontal direction. Do not change the setting without reason.
S8-2	UNDEFINED BIT OPERATION switch	(Showing the state of S8 built in SYSCON board)	Bit 58 is not defined for LTC while bit 74 is not defined for VITC. These bits are regarded as "0" until they are defined by SMPTE. ON : "1" OFF : "0" Make sure to set this switch to OFF position usually.
S8-3	Not used		—
S8-4	ERROR BYPASS ON/OFF		ON : To activate the error bypass circuit OFF : To inactivate the error bypass circuit

6.7 45 PIN MAIN (SA-K28U optional)

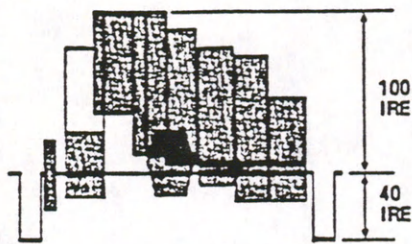
Symbol No.	Switch Name	Setting at Shipment	Function												
SW1 SW2 SW3	Not used	SW1, SW2, SW3 <div><div></div> ON</div>	Ineffective when the set is connected with the professional S22 series												
SW4 -1 (3A) SW4 -2 SW4 -3, 4	VTR select switch CONTROLLER select switch Not used	SW4 <div><div>ON</div><div><div></div><div></div><div></div><div></div></div><div>1 2 3 4</div></div>	<table><tr><td>SW4 -</td><td>OFF</td><td>ON</td></tr><tr><td>1</td><td>BR-S605</td><td>22 series</td></tr><tr><td>2</td><td>RM-G810, 860</td><td>RM-86</td></tr><tr><td>3, 4</td><td>—</td><td>—</td></tr></table>	SW4 -	OFF	ON	1	BR-S605	22 series	2	RM-G810, 860	RM-86	3, 4	—	—
SW4 -	OFF	ON													
1	BR-S605	22 series													
2	RM-G810, 860	RM-86													
3, 4	—	—													

6.8 RS-232C (SA-K27U optional)

Symbol No.	Switch Name	Setting at Shipment	Function															
SW1 SW2 SW3	Not used	SW1, SW2, SW3 <div><div></div> ON</div>	Ineffective when the set is connected with the professional S22 series															
SW4-1 SW4-2	DATA RATE SELECT switch	SW4 <div><div><div></div><div></div><div></div><div></div></div><div>1 2 3 4</div><div>ON</div></div>	<table><tr><th>SW4-1</th><th>SW4-2</th><th>Rate(bps)</th></tr><tr><td>OFF</td><td>OFF</td><td>1200</td></tr><tr><td>ON</td><td>OFF</td><td>2400</td></tr><tr><td>OFF</td><td>ON</td><td>4800</td></tr><tr><td>ON</td><td>ON</td><td>9600</td></tr></table>	SW4-1	SW4-2	Rate(bps)	OFF	OFF	1200	ON	OFF	2400	OFF	ON	4800	ON	ON	9600
SW4-1	SW4-2	Rate(bps)																
OFF	OFF	1200																
ON	OFF	2400																
OFF	ON	4800																
ON	ON	9600																
SW4-3	Not used		—															
SW4-4	TEST MODE ON/OFF switch		ON : For normal operation OFF : For test mode (Factory use only) Normally set to ON position.															

3.1.3 Signals required for video system adjustment

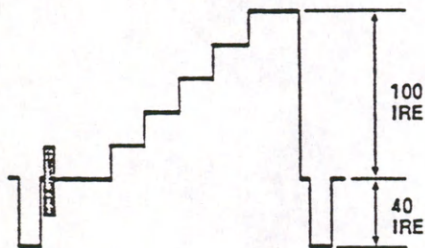
1. EIA color bar signal (75%, set at 7.5%)



To be used for Y/C level adjustment.

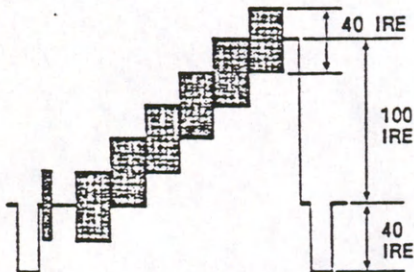
All color levels appearing in this color bar signal. Make sure not to use other color bar signals such as of 100% in the color level, since it leads to different and wrong measurement results.

2. Stairstep (5step) signal



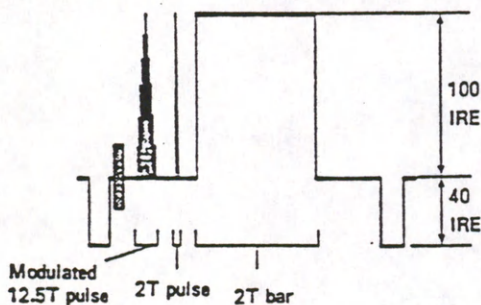
To be used for linearity adjustment.

3. Modulation stair step signal



To be used for DG correction.

4. Pulse & bar signals.



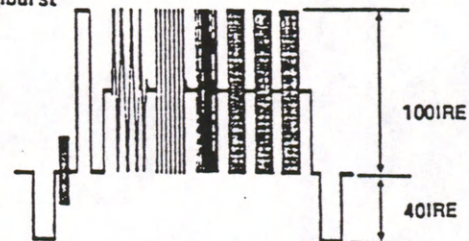
1) Modulated 12.5T pulse

To be used to Y/C timing.

2) 2T pulse

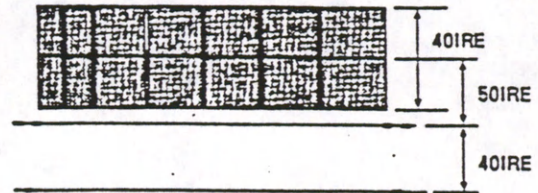
To be used for adjustment of phase equalizer and white/dark clip in the VHS mode.

5. Multiburst



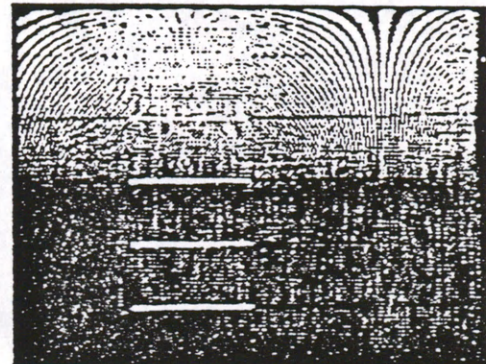
To be used for S-VHS sideband comparator adjustment.

6. Video sweep signal (100kHz to 5MHz)

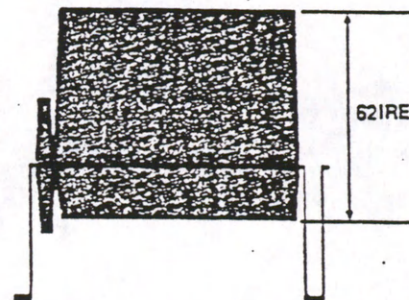


To supply this signal through the LINE IN terminal, make sure to use a sweep signal having a good characteristic in the H correlation in order to avoid erroneous operation of comb filters.

For a reference, a signal having a good H correlation shows such a clear pattern as neighboring black and white lines are the same in the width and the interval on the monitor as shown in the figure below.



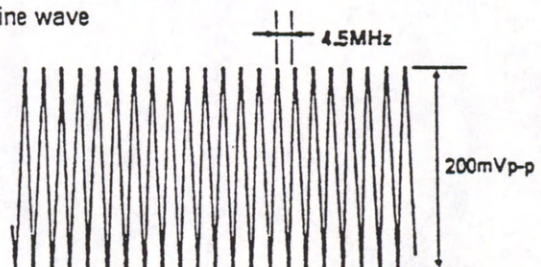
7. Blue or Yellow signal



Another monochromatic signal is substitutable.

Use of any monochromatic signal whose color level is high makes adjustment easy.

8. Sine wave



To be used for S-VHS mode detection adjustment.

Tape Transport Components

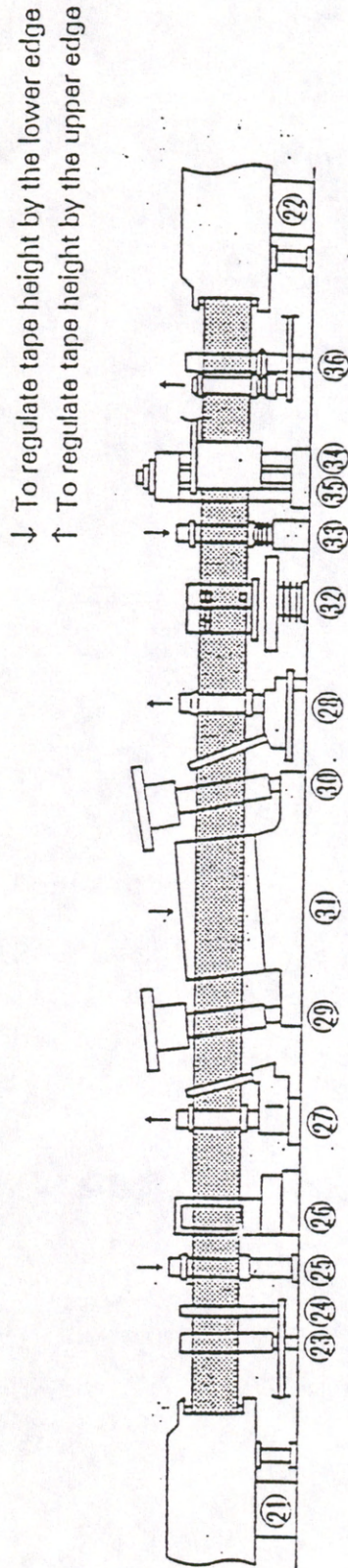
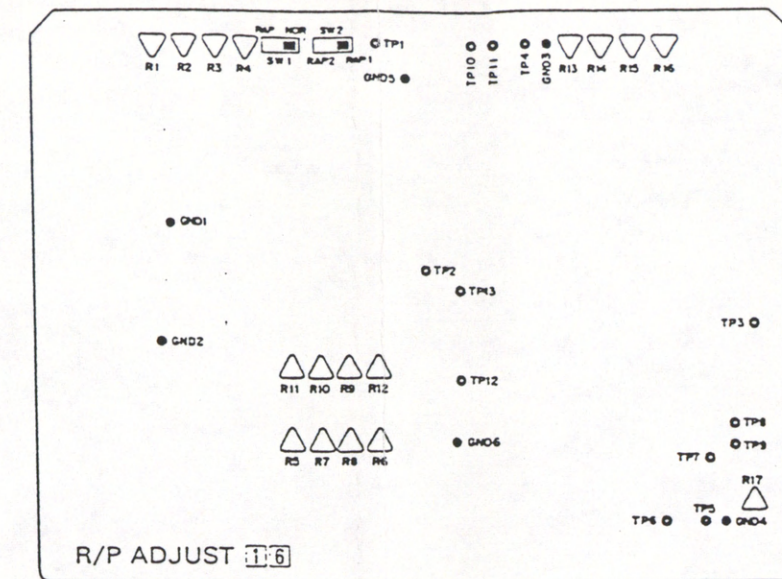
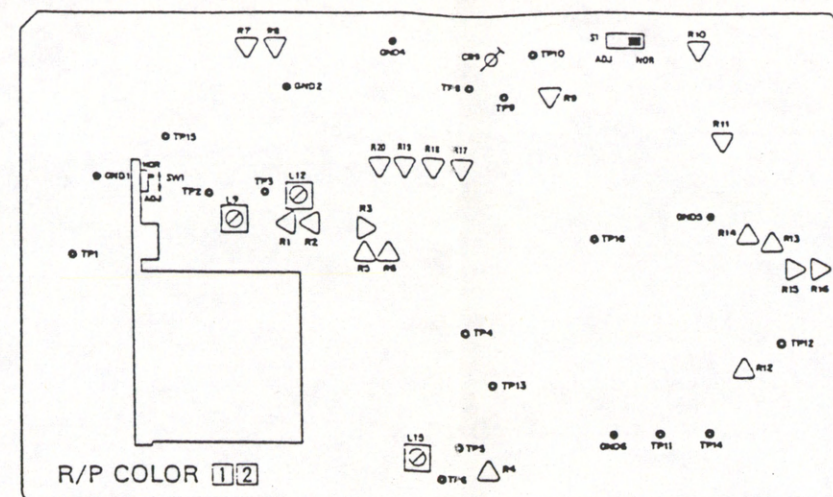
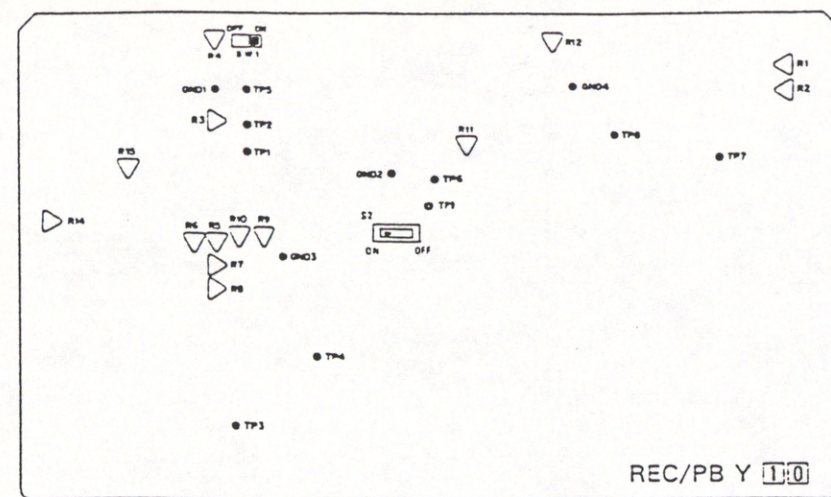


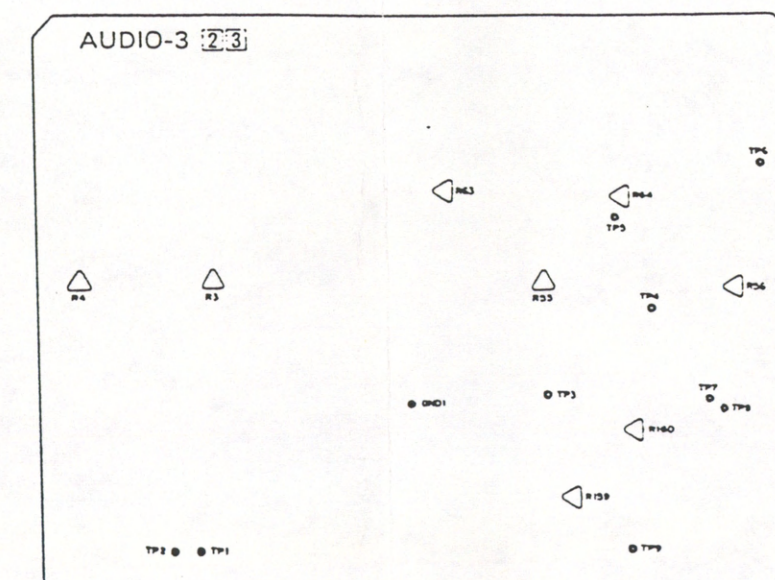
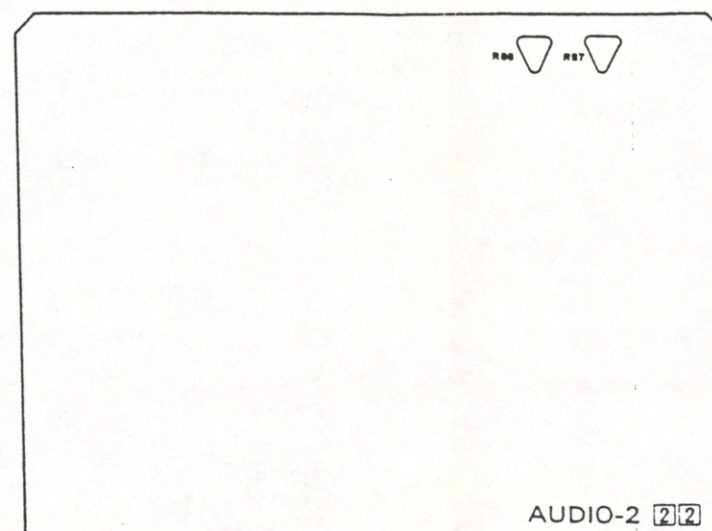
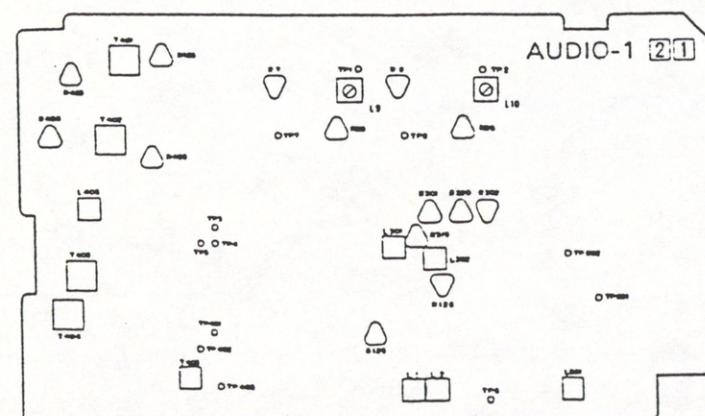
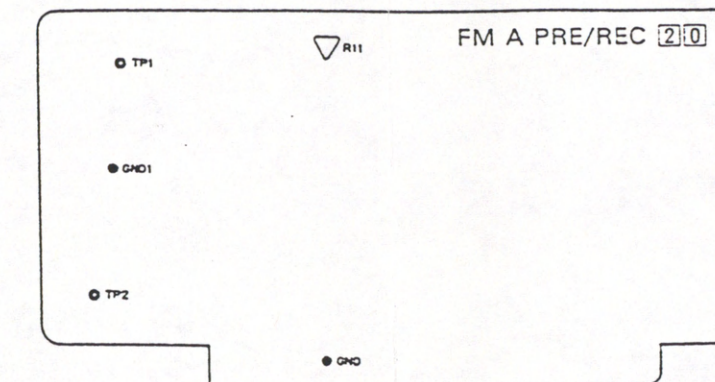
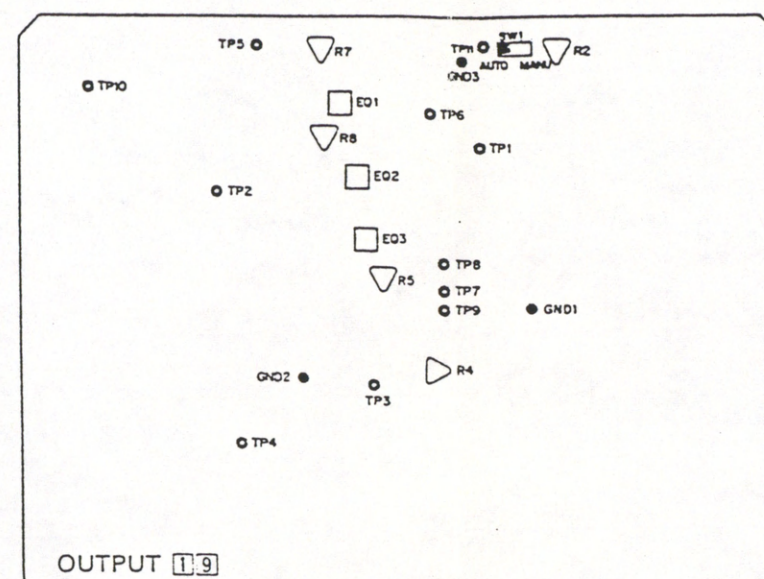
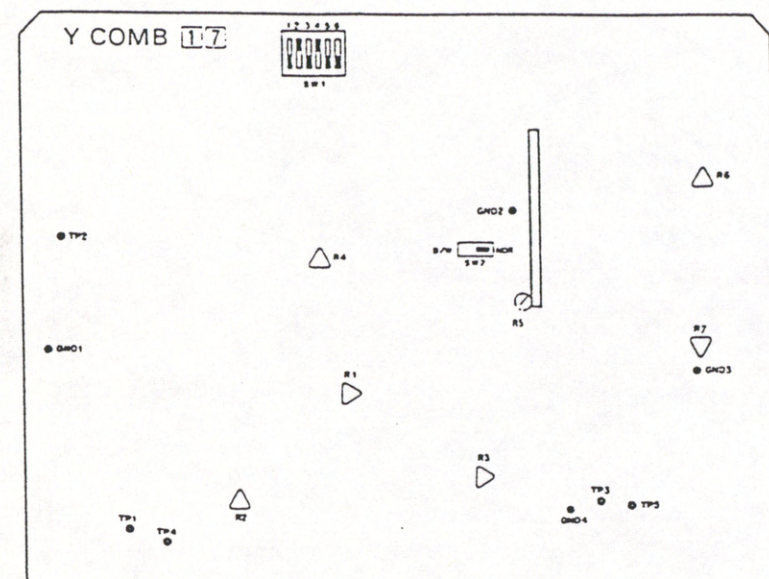
Fig. 2-2-5 Parts of tape transport system

- | | | |
|-------------------------------|------------------------------|------------------------------|
| (21) Supply reel disk | (27) Supply pole base ass'y | (31) Lower drum ass'y |
| (22) Take-up reel disk | { Guide roller | Upper drum ass'y |
| (23) Guide shaft | { Slant pole | (32) A/C head ass'y |
| (24) Tension arm | (28) Take-up pole base ass'y | (33) Take-up tape guide pole |
| (25) Supply tape guide roller | { Guide roller | (34) Pinch roller |
| (26) Full erase head | { Slant pole | (35) Capstan shaft |
| | (29) Supply inertia roller | (36) Guide arm roller ass'y |
| | (30) Take-up inertia roller | |

A-



Location of Adjustable Components



Video Head Replacement and Alignment: Basic Principles

To many people, replacing an upper or lower drum on a VCR and then performing the alignment to bring the unit back to factory specifications is viewed as a "trial-and-error" proposition. The task is *not* so difficult, however, when it is done correctly. This article outlines a few of the important basics involved in the replacement and alignment of a video head in a VHS recorder.

Following the Tape Path

Firstly, an understanding of the tape path and the track pattern will help to solve about 80% of your problems. For the sake of illustration, playing back a tape can be compared to driving a car

down a road. On a curved road, it is necessary to steer the car to maintain the same lane. But on a straight highway, a properly aligned car does not need steering to maintain its straight path. In effect, this is what is happening in a VCR. The tape path is designed in such a way that the video head does not have to steer its way down the path, because the tape is held in position around the video drum. If there were abnormalities, the head would deviate and miss the track (see Fig. 1). If this approach was *not* used, a VCR would need very advanced (and expensive) variable tracking head technology to be

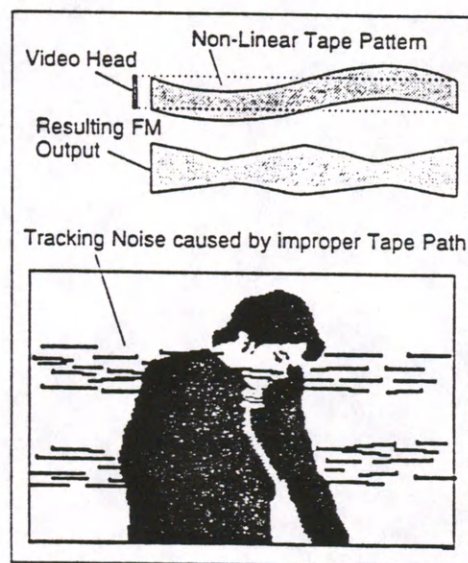
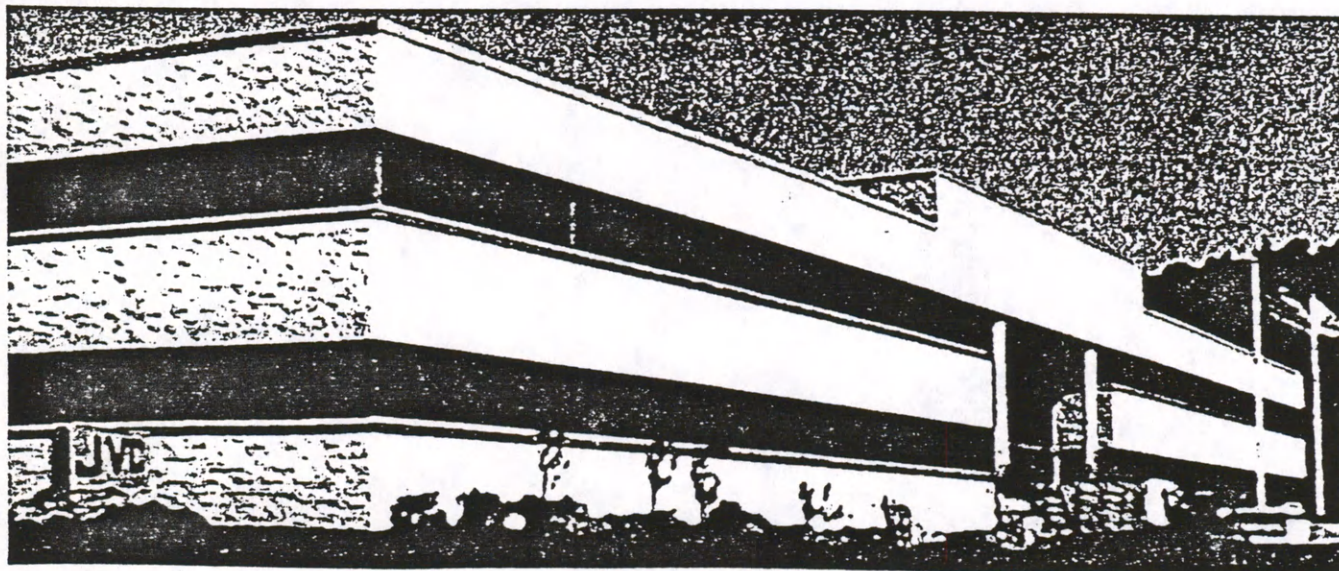


Figure 1

able to follow the tape's non-linear track pattern.

continued on next page...



Guiding the Tape

Guides are provided along the tape path to ensure that the tape's track pattern will be straight (linear). The most important of these guides is called the rabbit. It supports the videotape while it is wrapped around the video head assembly.

The mounting of the video head assembly on a VHS deck is tilted, not straight. This tilted mounting is required for proper helical recording. It is necessary to tilt the videotape at the entrance and exit sides of the drum to match the tilt of the video head assembly. Two slant poles are used for this purpose (see Fig. 2). Note the difference in the tilt of the two slant poles. Guide rollers are used to guide the tape before and after the video head drum. The guide before the drum is known as the entrance guide roller, or supply guide roller. The guide after the drum is known as the exit guide roller, or take up guide roller. Occasionally, both the slant pole and guide roller are supplied together as an assembly. This assembly is known as the pole base assembly.

The video tape is held properly on the rabbit with the help of the entrance guide, tape tension, and the exit guide. Proper tape tension is necessary to keep the tape from slacking on the video head assembly. A proper tape path provides linear playback FM output and a

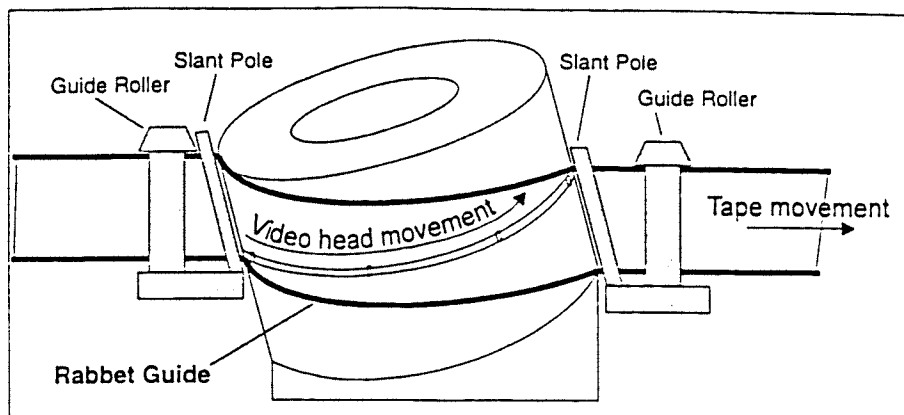


Figure 2

noise-free video picture when a standard tape is played back.

The Hi-Fi Audio Track

The VHS format uses a helical recording system. Video and Hi-Fi audio are recorded on the helical tracks. Hi-Fi audio is recorded precisely under the video tracks by a pair of Hi-Fi heads mounted on the video head drum using a technique known as deep layer recording. Proper Hi-Fi reproduction is ensured if the video heads trace over their tracks properly. The width of a Hi-Fi audio track is narrower than a standard video track. This is why a proper tape path alignment and servo adjustments are required for the reproduction of distortion-free Hi-Fi audio.

Maintaining Tracking

One video track corresponds to one field of the video picture. An

NTSC video frame is constructed of two fields. These two fields are required to reproduce a noiseless video frame. Different azimuth angles are used to record the first field and second field of the video frame. This is done to avoid crosstalk between adjacent tracks. The servo circuit ensures correct scanning of the track by using the proper head. The servo circuit can be overridden by manual tracking control. This is why the playback picture gets noisy when the tracking control is adjusted. The construction of the video head assembly and the servo control circuitry ensures that the video heads follow the track patterns on the tape.

Keep Free of Debris

As mentioned before, the most important reference guide for the videotape is the rabbit guide. Scanning should be perfect if the tape is wrapped 180° around the

continued on page 4...

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playback of a pre-recorded signal for true reproduction of luminance and color.

This relationship won't be maintained, however, if the correct orientation of the upper drum is not maintained during the installation. Incorrect tracks will be scanned during the playback if the orientation is not correct. This can be corrected by readjusting the control head or tracking control, but color rotation will be incorrect. This results in loss of color when a pre-recorded tape is played back. This incorrect phase relationship will be maintained when a recording is made using the incorrectly installed upper drum. So while it would be possible to reproduce the color signal from a tape recorded on that particular machine, color interchangeability with another VHS machine would not be possible. This is a common mistake seen during the installation of an upper drum. Refer to the service manual for the correct orientation of the upper drum before installing.

Position Adjustments

Centering of the upper drum is another factor to be considered while installing a new upper drum. Recent products have a very tight tolerance. Intolerable eccentricity could result in an unstable video picture and distorted audio.

The height of the video head chip pair from the rabbit decides which track is being scanned when the corresponding control pulse is picked up by the Audio Control head. This might vary due to manufacturing tolerances. Audio and control pulses are recorded and played back using the same head assembly. It is necessary to keep this relationship so as to maintain audio and video synchro-

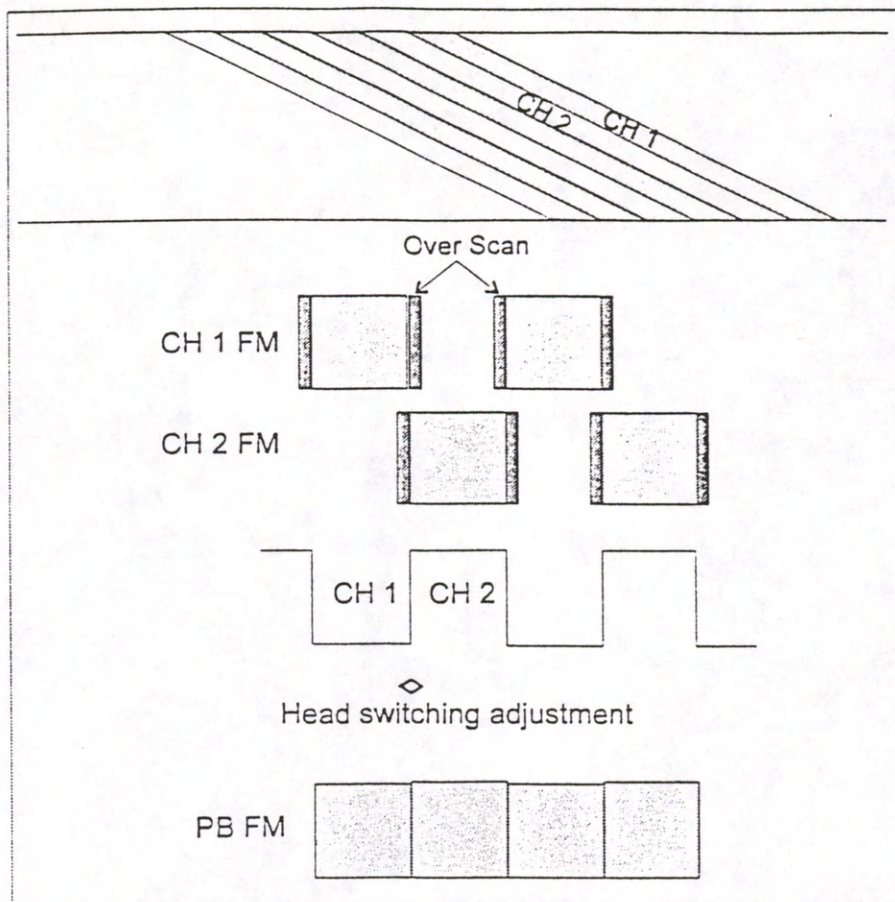


Figure 5

nization, and achieve maximum picture clarity at the center position of the manual tracking control. Mechanical position adjustment of the AC head is described in the service manual for this purpose. This adjustment is also known as the X-position or X-value adjustment. Standard test tapes such as the MHP-X tape are available for this adjustment.

Head Switching

The recorded video tracks on the tape are discontinuous. It is necessary to switch from one head to the other one at the end of each scan. A slight margin of over-scanning in VHS allows the switching point to be changed by a couple of horizontal TV lines. This switching point is standardized so that the switching occurs before

the V-Sync. It is necessary to perform the switching point adjustment precisely after replacing an upper drum. An incorrect switching point could cause unstable video, distorted video, and distorted Hi-Fi audio. Follow the directions in your service manual to perform this adjustment (see Fig. 5).

And finally, it is also necessary to check and or adjust the recording level and frequency response of the luminance and color signals after performing the tracking preset, X-value, and playback switching point adjustments.



lower drum and just rides on the rabbit. The relative positioning of the video head chips on the upper drum is such that one pair of heads positioned 180° apart can produce a continuous reading of the recorded material when the tape is moving. The two head chips of each pair are at exactly the same height from a fixed reference point. Thus, both heads will be scanning the same pattern if the tape is not moving. The servo circuit ensures that the tape is pulled by one track while the drum rotates 180° (see Fig. 3).

Scanning will not be sequential and uninterrupted, though, if the height positioning of one of the video heads is not exactly the same as the other one. This is caused when foreign materials get between the contact surfaces of the upper and lower drum assemblies when putting them together (see Fig. 4).

A height difference of only 58 µm between the two heads can cause both heads to scan the same track when the tape is moving in SP mode. Also, a height difference of 20 µm between the two heads can cause the same situation when playing back EP mode recorded tapes. One of the head's outputs will be registering a minimum if both heads are reading the same track due to opposite azimuth between the heads. Video tracks will be overwritten during record-

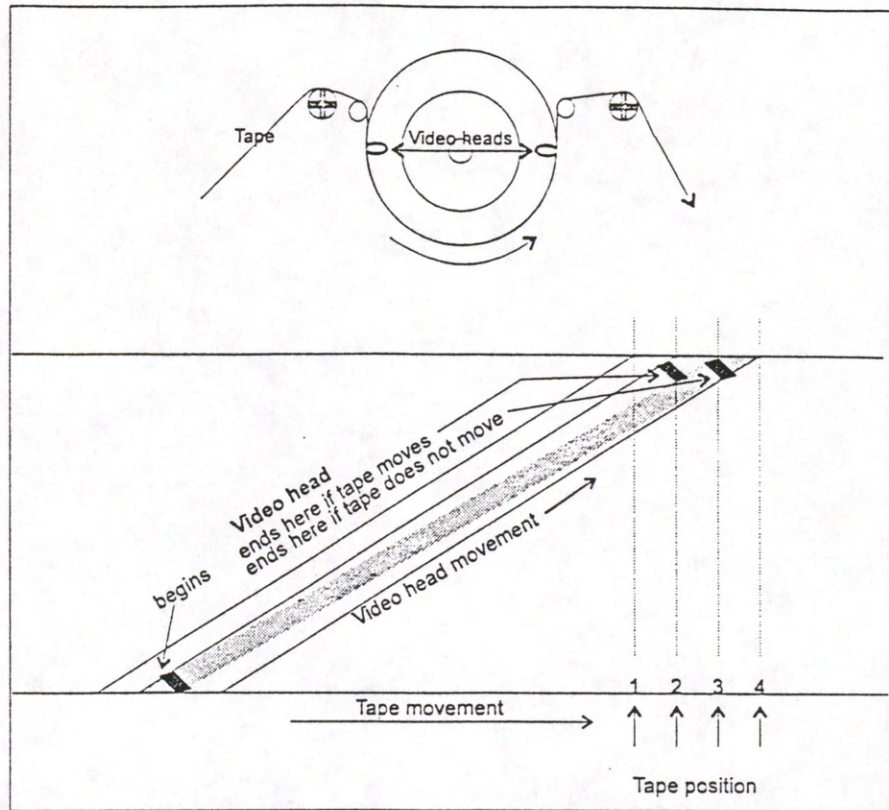


Figure 3

ing if the heads are at unequal heights. This is a common problem when installing a new upper drum. It is therefore necessary to clean the contact surface between the upper and lower drums for flux drops, solder, dust, burrs, etc., before reassembly.

Keeping Correct Colors

The color signal is down-converted and rotated before it is recorded on the videotape. The rotation is performed to remove

color crosstalk between the adjacent video tracks.

The color rotation is opposite in direction for adjacent tracks. The first field of an NTSC frame is recorded using a -6° azimuth head, and the color rotation is counter-clockwise. The second field is recorded using a +6° azimuth head and the color rotation is clockwise. These rotation control signals are referenced to a pulse called the Drum PG, which is generated by the lower drum. This relationship needs to be maintained during the

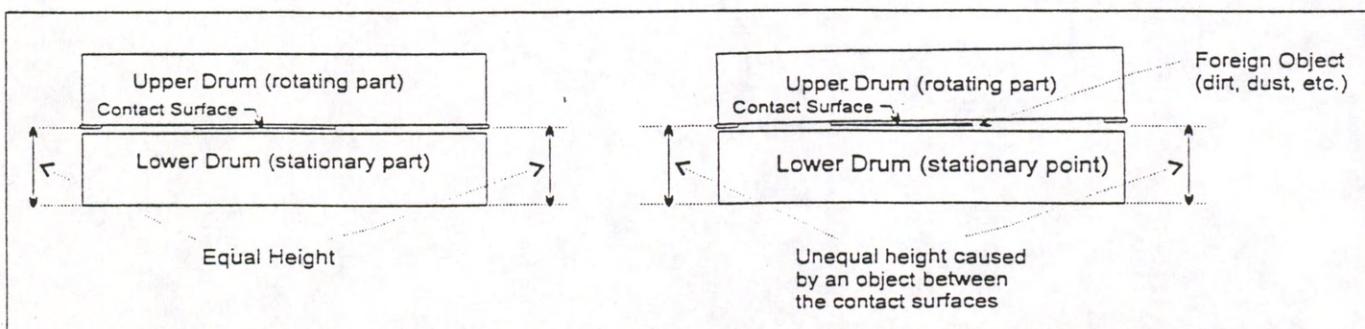
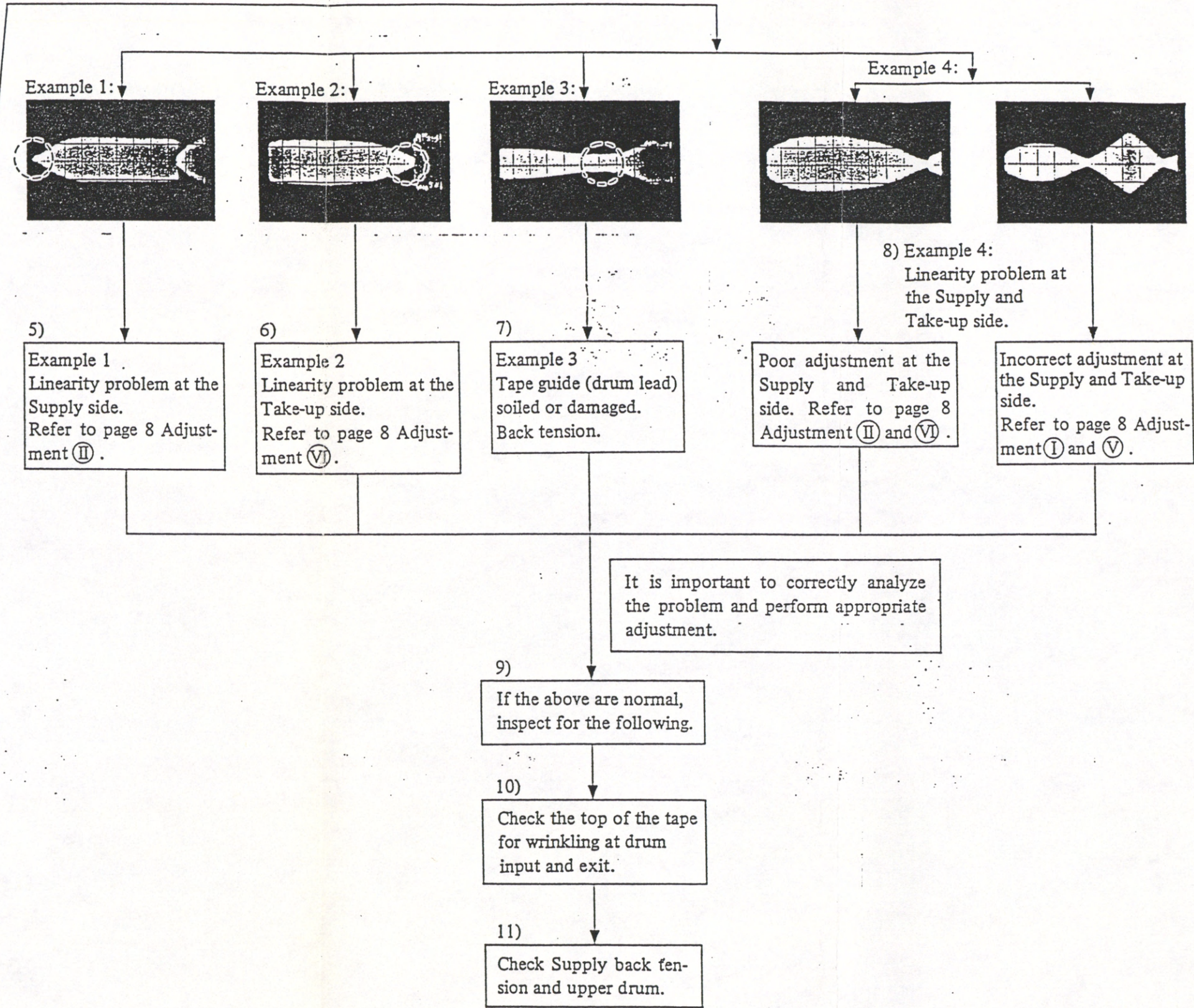
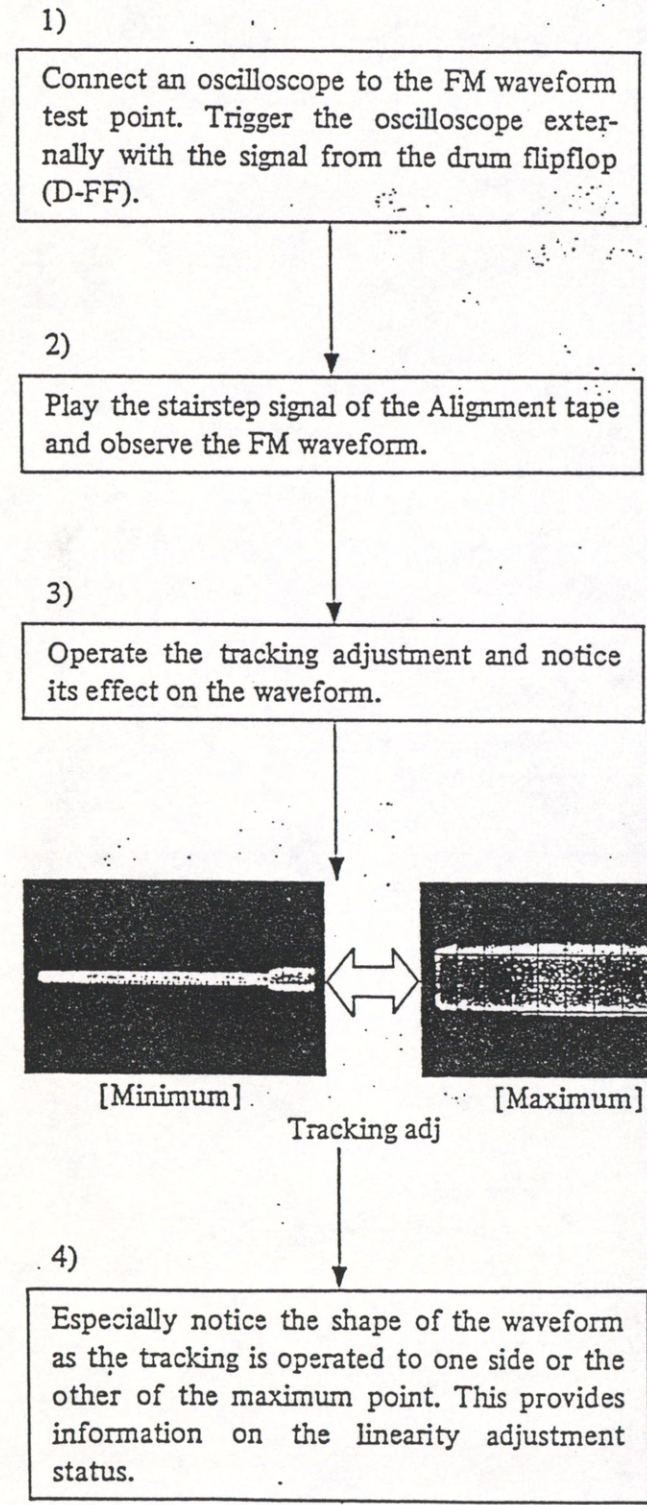


Figure 4

1.6.3 Linearity adjustment

1. Linearity must be adjusted by using the stair-step signal of the specified Alignment tape.

Check procedure



Before adjusting the Supply or Take-up guide roller, set the tracking adjustment for minimum FM waveform level. This allows observing delicate waveform variations.

When the FM waveform is slowly varied, confirm that the variation is linear and without distortion. It is important to check at the maximum waveform by operating the tracking adjustment to both sides of the maximum point.

1.6.5 Relative Height

1. Ordinarily, this needs to be checked only after replacing the video heads. Deviations of the relative height affect both recording and playback.

1) Effects on recording

The recording track widths of the channels differ in proportion to the deviation in relative height. This impairs the interchangeability of tapes recorded on the particular machine. The effect is most severe in the LP/EP mode.

When a tape recorded on this machine is played back on a properly adjusted machine, the FM signal level of each channel differs according to the difference in track width.

However, some models intentionally use different track widths and relative height deviation cannot be diagnosed only from FM signal level difference.

2) Effects on playback

When a standard recorded tape is played on a machine with relative height incorrect, the playback channel levels differ proportionately. Operating the tracking control yields the channel signal maxima at different points.

Check procedure

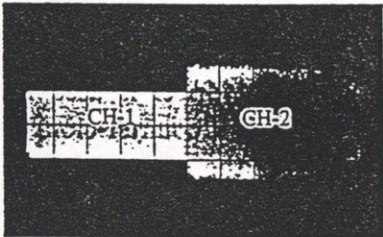
Note: Generally speaking, the relative height of video heads cannot be adjusted with equipment outside the factory. Those supplied as service parts are already fully adjusted at the factory and readjustment is not required. However, the relative height may be affected by contamination if the lower surface of the head drum is not cleaned during replacement. Proper balance when tightening the drum mounting screws is also important.

1)

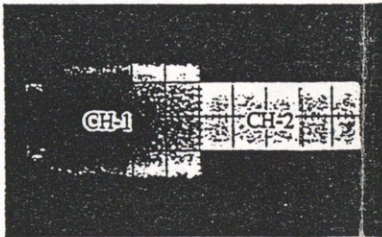
Play Alignment tape and observe the FM waveform.

2)

If the channel maxima occur at different points, the relative height is not aligned.



CH-2 waveform maximum



CH-1 waveform maximum

3)

If a problem is determined with the relative height, remove and check the video head drum.

4)

Carefully clean the opposing faces of the upper and lower drums.

5)

Reassemble and use special care to tighten the screws in a balanced manner.

6)

Play the stairstep signal of the Alignment tape and confirm correct relative height.

Note:
Difference in level at the FM waveform maximum points may occur. However, if the maximum points are aligned, the relative height is normal, regardless of the level difference.

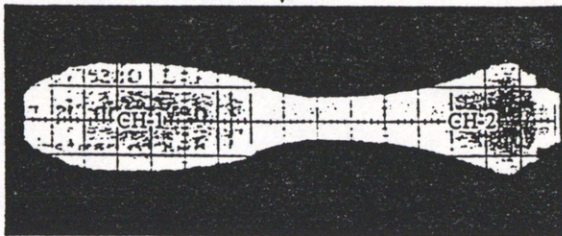
1.6.6 Video head centering

Note:
This is also a factory adjustment and seldom encountered in service. However, the need for adjustment may occur when replacing the video heads. If they are mounted off center with respect to the axis of rotation, the FM waveform will be adversely affected. Particular care is needed, as the margin for error is only about 10 microns.

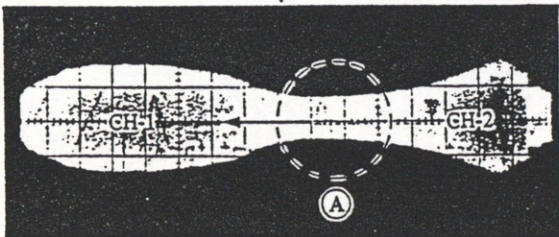
1. Checking procedure

1)
Connect one channel of a dual-trace oscilloscope to the FM waveform and the other channel to the drum flipflop. Synchronize this channel with the drum flipflop signal.

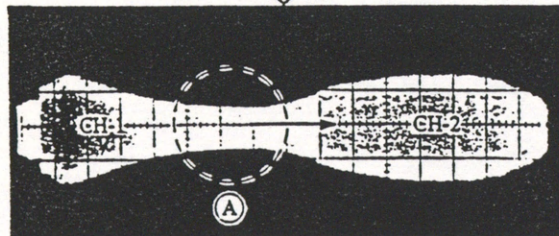
2)
Play the staircase signal of the Alignment tape and observe the waveform relationships.



4)
Even with the same waveform, if the waveform varies as shown in the figure with tracking operation, the head centering is not faulty.

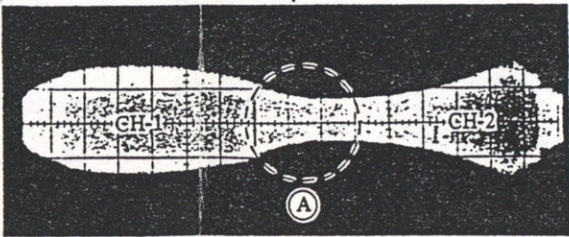


Tracking adj
: (A) portion is moving

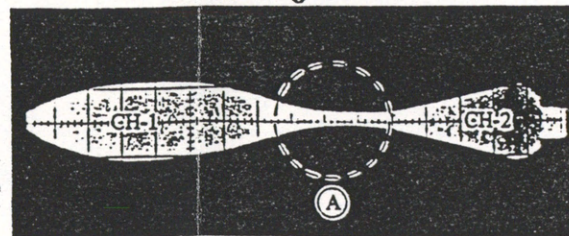


5)
Instead, the linearity may be defective and should be checked.

3)
While observing the waveform linearity, operate the tracking. If the waveform relationship appears as indicated in the figure, the problem is with head centering.



[Maximum]
Tracking adj
: (A) portion is same position



[Minimum]

6)
In recent models, the rotating shaft of the drum uses a brass ring, which simplifies centering adjustment. Refer to page 16 Replace Brass ring type head drum.

7)
If off-center is determined, observe the relation between the drum flipflop and FM waveform signals. The phase relation between these signals provides an indication of the direction of deviation.

8)
If the deviation is slight, after determining the direction, slightly loosen the drum securing screws. Gently tap the drum with a screwdriver handle or similar non-scratching tool in the direction needed for correction. Carefully retighten the screws and check again.

1.6.2 Before interchangeability adjustment

Prior to interchangeability adjustment, make sure to check the set according to the following flow-chart.

Note: Observe FM waveform after cleaning the tape transport system.

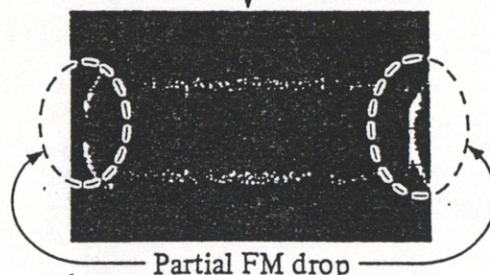
SYMPTOMS

Playback S/N impaired, Vertical jitter,
Noise in Hi-Fi sound

FM waveform

(Play back the stairstep segment of the alignment tape.)

Waveform (1)

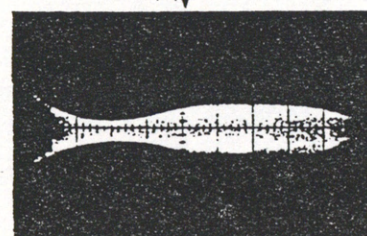


Partial FM drop

Adjust Tracking control for minimum
FM waveform level.

(Note: Adjust TRACKING control
in both directions.)

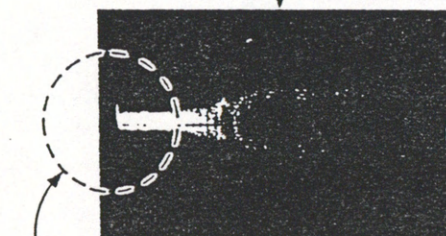
Waveform (2)



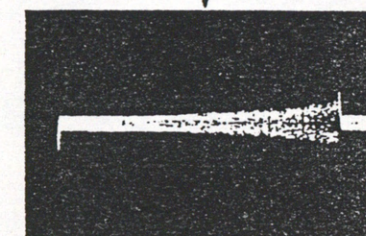
Poor linearity.



Partial FM drop is still observed.



Partial FM drop only in the supply side.



Sharp FM signal drop over more than
half the FM waveform.

Cause

Incorrect adjustment

Bad contact of video heads

Fluctuation in the recording level

Worn video heads

Remedy

Adjust the linearity of FM waveform.
(Refer to Sec. 1.6.3.)

Continue FM waveform check.
(Refer to Sec. 1.5.)

Readjust recording level.
(Refer to Sec. 1.6.9.)

Replace the upper drum.
(Refer to Sec. 2.)

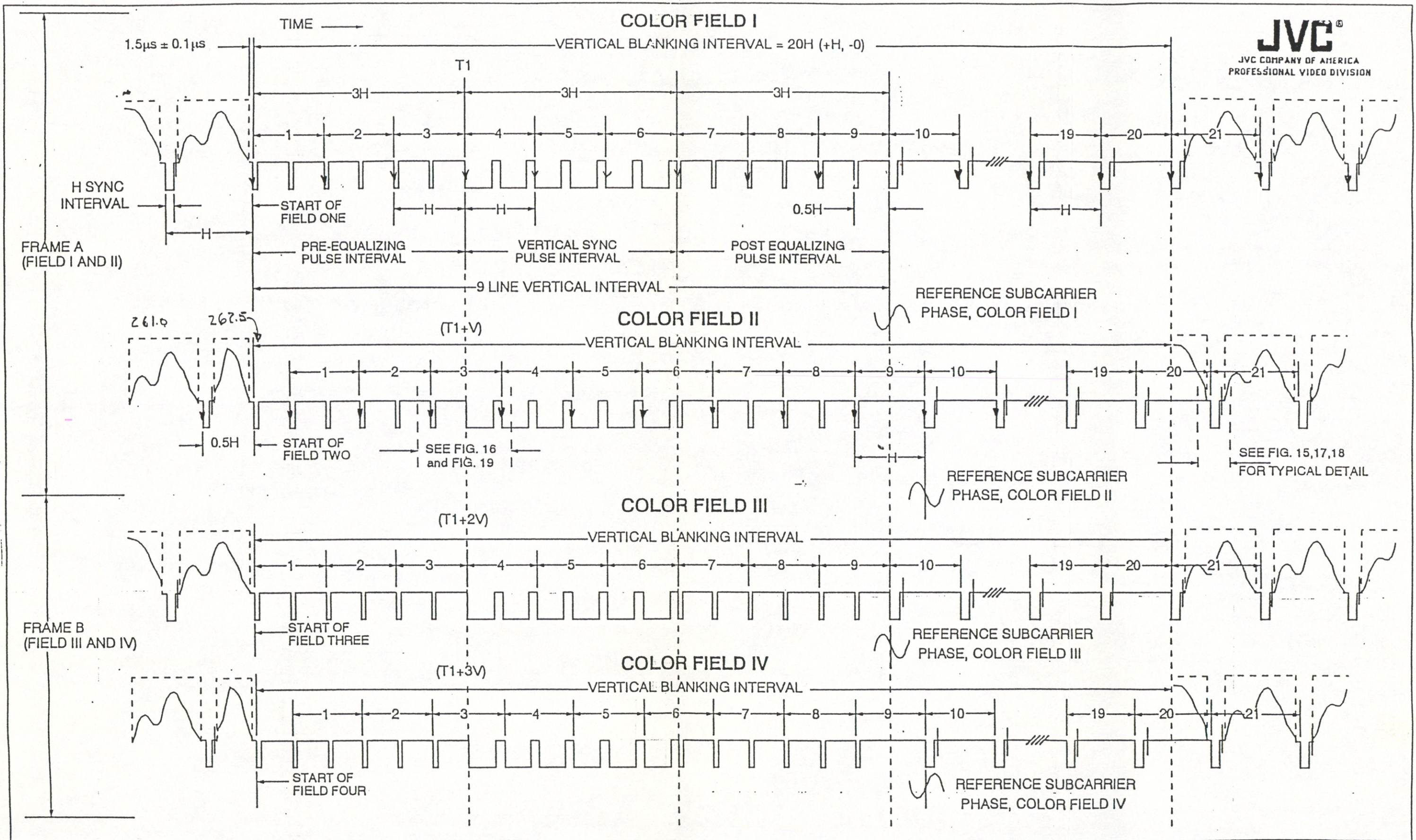


Fig. 14 NTSC Vertical Interval Details

VHS Tape Format

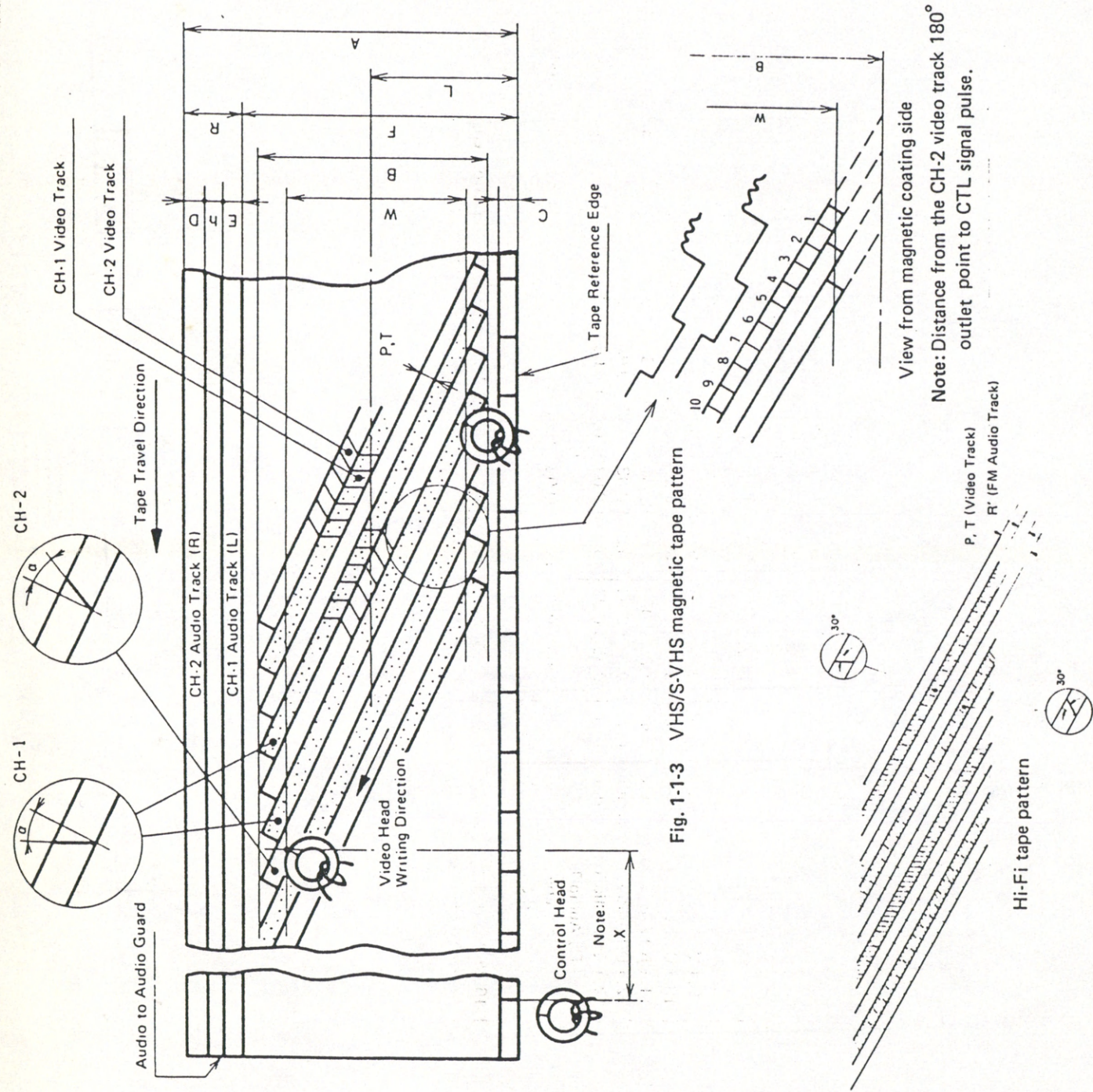


Fig. 1-1-3 VHS/S-VHS magnetic tape pattern

Fig. 1-1-4 VHS/S-VHS Hi-Fi magnetic tape pattern

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Item		NTSC		PAL/SECAM		Remarks
		SP mode	EP mode	SP mode	LP mode	
1. (A) Tape Width	mm	12.65 ± 0.01	12.65 ± 0.01	12.65 ± 0.01	12.65 ± 0.01	(Upper Drum)
2. (Vt) Tape Speed	mm/sec	33.35 ± 0.5%	11.12 ± 0.5%	23.39 ± 0.5%	11.70 ± 0.5%	
3. (φ) Drum Diameter	mm	62 ± 0.01	62 ± 0.01	62 ± 0.01	62 ± 0.01	
4. (Vh) Writing Speed	m/sec	5.80	5.83	4.85	4.86	Measured from reference edge
5. (P) Video Track Pitch	mm	0.058	0.019	0.049	0.024	
6. (B) Video Width	mm	10.60	10.60	10.60	10.60	
7. (W) Video Effective Width	mm	10.07	10.07	10.07	10.07	Measured from reference edge
8. (L) Video Track Center	mm	6.2	6.195	6.2	6.195	
9. (V) Video Track Width	mm	0.058	0.019	0.049	0.024	
10. (C) Control Track Width	mm	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	Single track CH-2 (R) CH-1 (L)
11. (R) Audio Track Width	mm	1.0 ± 0.03	1.0 ± 0.03	1.0 ± 0.03	1.0 ± 0.03	
12. (D) Audio Track Width	mm	0.35 ± 0.03	0.35 ± 0.03	0.35 ± 0.03	0.35 ± 0.03	
13. (E) Audio Track Width	mm	0.35 ± 0.03	0.35 ± 0.03	0.35 ± 0.03	0.35 ± 0.03	Measured from reference edge
14. (F) Audio Track	mm	11.65 ± 0.03	11.65 ± 0.03	11.65 ± 0.03	11.65 ± 0.03	
15. (h) Reference Line	mm	11.65 ± 0.03	11.65 ± 0.03	11.65 ± 0.03	11.65 ± 0.03	
16. (θo) Guard Width	mm	0.3	0.3	0.3	0.3	(Stopped) (Running)
17. (θ) Video Track Angle	mm	5° 56' 7.4"	5° 56' 7.4"	5° 56' 7.4"	5° 56' 7.4"	
18. (α) Video Head Gap	mm	5° 58' 9.9"	5° 56' 48.1"	5° 57' 50.3"	5° 56' 58.8"	
19. (X) Azimuth Angle	mm	6° ± 10'	6° ± 10'	6° ± 10'	6° ± 10'	Inside the W bottom edge At the tape beginning and at the drum entrance
20. () Positions of Audio and Control Heads	mm	79.244	79.253	79.244	79.248	
21. () Positions of Front Edge of V-SYNC	mm	5-8 H	5-8 H	5-8 H	5-8 H	
22. (R') Tape Back-Tension	mm	30-45 g	30-45 g	30-45 g	30-45 g	Measured from reference edge
23. (R') FM Audio Track	mm	Min. 0.02	Min. 0.02	Min. 0.02	Min. 0.02	
24. (R') Width	mm	0.016-0.049	0.016-0.049	0.016-0.049	0.016-0.049	

Table 1-1-1 Magnetic tape pattern

Note: Tests and measurements shall be made under the following conditions.
Temperature: 20°C ± 2°C, Relative humidity: 65% ± 5%
However, unless essential to the judgement, these can also be done under the following conditions.
Temperature: 5-35°C, Relative humidity: 40-80%

dBs to Vrms to Vpp Conversion Chart

dBu	Vrms	Vpp
+50	245	693
+45	138	390
+40	77	219
35	44	193
30	24	69
25	13.8	39
20	7.75	22
19	6.90	19.5
18	6.15	17.5
17	5.48	15.5
16	4.89	13.8
15	4.36	12.3
14	3.88	11.0
13	3.46	9.8
12	3.08	8.7
11	2.75	7.8
10	2.45	6.9
9	2.18	6.2
8	1.95	5.50
7	1.73	4.90
6	1.55	4.37
5	1.38	3.90
4	1.23	3.47
+3	1.09	3.09
+2	0.97	2.76
+1	0.87	2.46
0	0.7746	2.19
-1	690mV	1.95
-2	615mV	1.74
-3	548mV	1.55
-4	489	1.38
-5	436	1.23
-6	388	1.10
-7	346	978mV

dBu	Vrms	Vpp
-8	308mV	872mV
-9	275mV	777mV
-10	245mV	692mV
11	218	617
12	195	550
13	173	490
14	155	437
15	138	390
16	123	347
17	109	309
18	97.5	276
19	86.9	246
20	77.5	219
21	69.0	195
22	61.5	174
23	54.8	155
24	48.9	138
25	43.6	123
26	38.8	110
27	34.6	98
28	30.8	87
29	27.5	77.7
30	24.5	69.3
31	21.8	61.7
32	19.5	55.0
32	17.3	49.0
34	15.5	43.7
35	13.8	39.0
36	12.3	34.7
37	10.9	30.9
38	9.75	27.6
-39	8.69	24.6
-40	7.75	21.9
-41	6.90	19.5

dBu	Vrms	Vpp
-42	6.15mV	17.4mV
-43	5.48mV	15.5mV
-44	4.89mV	13.8mV
45	4.36	12.3
46	3.88	11.0
47	3.46	9.79
48	3.08	8.72
49	2.75	7.77
50	2.45	6.93
51	2.18	6.17
52	1.95	5.50
53	1.73	4.90
54	1.55	4.37
55	1.38	3.90
56	1.23	3.47
57	1.09	3.09
58	.975	2.76
59	.869	2.46
60	.775	2.19
61	.690	1.95
62	.615	1.74
63	.548	1.55
64	.489	1.38
65	.436	1.23
66	.388	1.10
67	.346	.979
68	.308	.872
69	.275	.780
-70	.245	.693
-80	77.5μV	219μV
-90	24.5μV	69.3μV
-100	7.75μV	21.9μV
-110	2.45μV	6.93μV
-120	0.775μV	2.19μV